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Published by
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PENTON BUILDING
CLEVELAND, O.

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Berlin . . Berlin, N. W. 40, Roonstrasse 10

Member Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association.

Published every Monday. Subscription in the United States, Cuba and Mexico, one year $4, two years $6; in Canada, one year $6.60, two years $11.20; in Great Britain and European countries, one year £2.

Entered as second class matter at postoffice at Cleveland under the Act of March 3, 1879.

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As the Editor Views the News

WASHINGTON on Friday was seething with under-cover activities brought about by the impressive volume of protest against the senate's action on the Wagner bill and the extension of NIRA. While the final outcome is not clear, it seems likely at this writing that the disputes bill will be modified considerably (p. 31), that the rewritten text will be more acceptable to industry and that Senator Wagner will agree to many of the contemplated changes. It is to be hoped that from now on the Wagner and NIRA bills may be considered jointly by congress— as supplementary to each other, rather than as separate measures.

• • •

Tide of Protest Is Rising

Last week's conventions contributed heavily to the growing opposition to unsound government policies. In New York, E. G. Grace, speaking at the meeting of the American Iron and Steel institute (p. 23), did not mince words in blaming governmental experiments and meddling for holding back recovery. In Chicago, members of the National Machine Tool Builders' association voted (p. 27) to recommend the termination of its NIRA code on June 16. Almost simultaneously in New York the code authority of the scrap iron and steel industry voted to liquidate its code operations on the same date.

• • •

How Will Senate Act?

It remains to be seen whether the rising tide of wrath against the activities of political demagogues will bring salutary results in congress. The ability of the senate to muster enough votes to sustain the President's bonus veto seems to indicate that that body can be shocked to its senses if the pending calamity is sufficiently alarming. This affords a ray of hope that the members of the august body may agree to changes in the Wagner and NIRA bills, which they passed with so little regard for the opinion of industry and for the rights of 20-odd millions of unaffiliated workers. Spokesmen at the institute meeting indicated that the employes participating in employe representation plans will not readily abandon them for a dictated method of collective bargaining. Perhaps we are nearing a showdown on that phase of labor relations.

• • •

Uncertainty Hurts Business

Settlement of the question of NIRA and the Wagner bill is imperative if industry is to avoid another slump. The uncertainty is blamed for another slip (p. 69) in the steelworks operating rate. On the other hand, settlement of the General Motors labor difficulties, which leaves only the isolated White strike current in the auto industry, has enabled car assemblies (p. 30) to regain the 100,000 mark. Everywhere, one finds restrained optimism which is based on evidence that business is ready to go ahead when political restraints are removed. Machine tool builders believe they are on the road to a recovery of major proportions (p. 28), and that an acute shortage of skilled labor is imminent.

• • •

A. I. S. I. Papers Are Timely

How welding may aid fabricators who cannot afford the expenditures necessary for one-piece construction of steel tops for automobiles is indicated (p. 29) in the practice adopted by Nash. This company uses four stampings per top, which are welded together and finished so that the welds are not visible. On the other hand, new hydraulic presses of powerful construction (p. 53) simplify the prfoblems of builders who can avail themselves of the advantages of one-piece construction. . . . The three American Iron and Steel Institute papers are of unusual timeliness: "Modern Steels and Weight Reduction" (p. 40); "The Economic Importance of Replacing Obsolete Mill Equipment" (p. 45); and "Precision Mills for Rolling Strip, Bars and Rods," which will be presented in a later issue.

E. L. Shaner

AS AMERICAN IRON AND STEEL INSTITUTE BANQUETED IN NEW YORK, CONCLUDING 44TH GENERAL MEETING

Steelmakers, Quietly Confident, at Institute Assail Curbs on Natural Recovery

IN AN atmosphere healthily charged with restrained optimism, more than 1700 members and guests of the American Iron and Steel institute assembled Thursday, May 23, in the ballroom of Hotel Commodore, New York, on the occasion of its forty-fourth general meeting.

As speaker after speaker, appearing in turn on the carefully prepared program, dealt repeated hammer blows against unsound doctrines promulgated by political demagogues, it became apparent to the great audience that the keynote of this meeting was a dispassionate protest against destructive governmental legislation—a plea for sanity in Washington which will permit the nation to win its way to recovery by the only effective means knowns to man, namely hard work and thrift.

From the masterly presidential address of Eugene G. Grace at the beginning of the opening session in the morning until the adjournment gavel was heard late in the evening every address was marked by a condemnation of unsound governmental policies.

Decry Experimenters

The principal targets were the Wagner disputes bill, the proposal for a 30-hour week, the methods but not the principles of the economic security bill, certain features of the banking bill and the general tendency of the government administration to give experimental reform priority over proved recovery measures.

The high light of the morning session was the address of President Grace. He reviewed the steel industry's co-operation with the government during the past two years, and summarized the tangible results in terms of the 420,000 workers now employed—almost a peak-time force — and of wage rates, which are above 1929 levels.

"Yet in spite of these efforts," he said, "we have failed to achieve the desired goal, namely recovery." He declared that the chief barrier to recovery is political — the economic uncertainties underlying too many experiments and the proposals to regiment American business and labor.

Mr. Grace then discussed specifically the destructive features of several legislative proposals, with particular emphasis upon the implications of the Wagner bill. His remarks are presented in abstract on page 26.

The only direct reference to the industrys attitude toward continuing its code under NIRA came in the closing paragraphs of Mr. Grace's address. These words are significant:

"Whatever the future of this act may be, if any at all, the problems with respect to the successful management of the steel industry are still before us and must be met. Certainly whatever the future holds in store for us, we should have the common-sense to realize the necessity of exerting every possible effort to prevent a recurrence of the evils, abuses and unfair business methods of the past and of so managing our indutry as to afford the necessary protection to all parties concerned."

JOHN B. TYTUS

Awarded Gary Medal for 1935

Vice president of the American Rolling Mill Co., Middletown, O., Mr. Tytus was honored for outstanding service to the iron and steel industry for his work on the continuous mill. From 1897 to 1902 he was a traveling salesman, the following two years being in construction work. In 1904 he joined the American Rolling Mill Co., for two years being in a sheet mill crew, two years assistant to the superintendent, and two years superintendent at the Zanesville, O., mill. The ensuing two years he helped design and construct a sheet mill at Middletown. For ten years he was sheet mill superintendent and assistant general superintendent at Middletown, O., meanwhile experimenting with the continuous mill. From 1922 to 1927 he supervised the designing, construction and operation of the continuous mill at Ashland, Ky. In 1927 he became assistant vice president and later vice president.

The addresses of the morning session were noteworthy in that all had been carefully prepared. Extemporaneous remarks, such as those which characterized many previous meetings, were cut to a minimum. The result was that the entire program reflected the air of conviction which comes when an audience realizes that each speaker is measuring his words carefully.

The only exception to this rule was furnished by the brief remarks by Charles M. Schwab. Retaining his accustomed disdain toward the use of a manuscript, the veteran steelmaker disregarded his 1200-word prepared text and devoted most of his talk to praise of the business-like and efficient manner in which the institute is functioning during this difficult period. He expressed gratification that the younger men, as he termed them, have taken over the administration of the institute's affairs and — to use his own words — are doing a better job than their predecessors.

Three Steel Chiefs Comment

Following his address as president of the institute, Mr. Grace presented the executive heads of three steel companies, each of whom spoke briefly on assigned subjects.

With the introductory remark that "being the president of a company three times larger than your nearest competitor has its compensations—I hope," Mr. Grace presented W. A. Irvin, president of the United States Steel Corp.

In reviewing the high spots of the year, Mr. Irvin stated that the steel industry has been making a "real and sincere attempt to carry out the mandate of congress as expressed by it in NIRA and in supporting the administration in making this experiment in the interest of recovery."

Whether or not it has helped recovery and irrespective of the success or failure of the experiment, "we of the steel industry have done our part as well as we knew how, and have done it conscientiously, in an endeavor to carry out the intent of the act," he added.

Mr. Irvin pointed out that under the code, filed prices now are less than those ruling in 1926, and wage

rates are 7 per cent higher than those of 1929. The financial return under these conditions has been disappointing. During 1933, he explained, 190 members of the steel code reported total losses, before dividends, of $59,694,000 and for 1934, 177 members reported losses of $11,797,000. The loss for 1933 represents about 1¼ per cent and the loss for 1934 about ¼ per cent on an investment of $4,750,000,000.

A striking development of the year, said Mr. Irvin, has been the increase in imports of foreign steel. He cited government figures showing that imports of shapes, bars, barbed wire, nails and steel pipe in the first quarter of 1935 totaled 29,676 tons, an increase of more than 100 per cent over the 14,810 tons imported in the same quarter of 1934.

"The increasing tendency in the volume and diversity of these imporations is causing deep concern to our domestic steel industry," he said. He pointed out that they are penetrating into domestic markets beyond the seaboard, gulf and lake ports, "with resulting tendency to induce demoralization in the marketing of products distributed in these areas."

Sees Brighter Times

Tom M. Girdler, chairman and president, Republic Steel Corp., prefaced his remarks on "The Outlook for Steel" with the statement that although the industry "is not entirely out of the woods," from the standpoint of markets, a number of influences point definitely toward increased sales and larger tonnage.

In support of this belief he stated that vast government expenditures will mean increased sales of consumers' goods, which will aid the consumption of steel, and that aside from federal expenditures, there is considerable evidence of a business recovery along normal lines, "due to return of confidence, resumption of buying deferred through the depression years, and the desire of people to possess new and improved products."

Mr. Girdler emphasized the extent to which research and invention in the steel industry may lead to replacement of a large share of the nation's industrial equipment. He suggested that the home may prove to be the outstanding example of replacement of other materials by steel products. He said:

"Just as the steel-built refrigerator has been replacing wood, steel will be used for cabinets, tableware, furniture—and even the house itself. . . . Without the use of steel or steel machinery, it is doubtful whether a single product manufactured today could even be brought within the masses of the people. Steel is literally the master tool of civilization."

From this reasuring view of technical and marketing progress, Mr. Girdler turned to some of the obstacles confronting industry.

"The Wagner bill," he declared, "is the outstanding legislative monkey wrench which today threatens to jam the wheels of recovery."

He predicted that if it is enacted, it will plunge the country into unprecedented bitter strife and litigation. He said the bill was not designed to promote peace, nor to aid recovery. He charged that it was enacted "upon the insistence of/and for the exclusive benefit of the A. F. of L.." and that the purpose behind it is to force the closed shop upon millions of free American citizens.

Pastry Chef Builds Blast Furnace; Violates Code!

WHILE the dinner was being served at the annual banquet, chefs of the Hotel Commodore brought to the speaker's table a large reproduction of a blast furnace made of pastry. After calling the meeting to order presiding officer Eugene G. Grace took occasion to compliment the chef for "being the first man under a fair code of competition under NRA to succeed in creating additional iron or steelmaking capacity."

* * *

Frank Purnell was applauded warmly when he said, "I wish to take this opportunity to express my admiration for the courageous stand which Mr. Weir has taken with respect to his labor situation throughout the past two years."

Frank Purnell, president, Youngstown Sheet & Tube Co., in his initial appearance as speaker at an institute meeting, discussed "Progress in Labor Relations." He touched upon the growth of employe representation plans during the past 17 years, stating that today practically all of the employes in the steel industry have adopted this method of collective bargaining.

"It cannot be emphasized too strongly," said Mr. Purnell, "that any successful plan of dealing with employes must be founded upon the basic principle that there can be harmony and mutual consideration between employes and employer, upon honesty of purpose, freedom of speech and due regard for the rights and aspirations of both. They must work out their problems together, in a peaceable manner, instead of in an unnatural condition of hostility. The steady and successful operation of a manufacturing plant is a matter of common interest both to the employes and the employer and, therefore, operating problems should be discussed and settled by workmen and management for the benefit of both.

"Under employe representation plans, the employes are represented by men whom they know personally and who are chosen and elected from among themselves. These men are naturally familiar with plant conditions and personnel because it is *their* plant—and when they bring up a question on behalf of the men whom they know and represent, they know what they are talking about.

"This, in my opinion, represents one of the most decided advantages which employe representation plans have over the professional labor union."

Mr. Purnell referred to a recent survey of the operation of employe representation plans in the steel industry in 1934. The study covered 101 companies which employ over 90 per cent of the total employed in the industry. The survey showed that 89 per cent of the employes in operating divisions are giving active support to representation plans.

The survey also showed a total of some 15,600 questions arising under representation plans which were settled in a quiet, orderly manner. Of this number, nearly 73 per cent were decided in favor of employes, while only 16.4 per cent were decided in the negative. There were compromises in 6 per cent of the cases and 4.6 per cent of them were withdrawn.

In conclusion, Mr. Purnell declared that in his opinion employe representation plans are here to stay and that employes, who have shown their preferences for employe representation so overwhelmingly, will not submit to the dictates of those who seek to force upon them a type of collective bargaining they do not desire.

Eighty Years of Service

In reporting on the activities of the institute during the past year, Walter S. Tower, executive secretary, commented upon the long span of years in which the Institute and its predecessor association have served the industry.

"Although the Institute itself dates only from 1908, its roots run back for 80 years. . . . There are statistical records which have been made for the industry almost without a break during that long interval."

Mr. Tower announced that the twenty-first edition of the *Directory of Iron and Steel Works*, with extensive revisions and improvements, will be ready for distribution early in June.

The *Annual Statistical Report* for 1934, in which the usual statistical data will be presented in revised form to accord more closely with current practice, will not be available before the end of June.

The executive secertary reported

briefly upon the activities of the committee on industrial relations and the Institute's publicity division. He outlined some of the intricate detail which is involved in the filing of base prices at the beginning of each calendar quarter and explained how the institute staff has been organized effectively to cope with the problem of handling this routine efficiently.

He also summarized the activities of the committee on commercial matters, the traffic committee, the committee on labor and the statistical and technical comittees.

Referring to the work of the enforcement division, whose staff of 21 men deals with complaints of alleged code violations, Mr. Tower declared that exclusive of questions relating to the ability of concerns to quailfy as jobbers, the number of complaints received from all sources during the last year exceeds 2000. More than half of the investigations completed have shown that the complaints were not justified.

No Flagrant Violations

"It is true," he said, "that so far the enforcement division has not found, in any case where an investigation has been completed, that a violation of the code appears clearly to have been the result of deliberate or open disregard of code provisions on the part of any member." In most of the cases, violations were the result of unintentional errors or misunderstanding, he added.

"A year of experience under the amended code," he concluded, "indicates that it has been a remarkably effective instrument for eliminating unfair practices in the industry."

The three technical papers presented at the afternoon session probably established a new high standard in point of the importance and timeliness of the subjects which were covered.

S. M. Weckstein, assistant chief engineer, Timken Roller Bearing Co., Canton, O., presented a paper on "Precision Mills for Rolling Strip, Bars and Rods." It was discussed by W. C. Oberg, manager of sales engineering, Carnegie Steel Co., Pittsburgh; J. T. Somers, vice president, Wyckoff Drawn Steel Co., Pittsburgh; and Earl Smith, chief metallurgist, Republic Steel Corp., Youngstown.

"Modern Steels and Weight Reduction"—a topic receiving unusual attention a this time—was the subject of a paper (see p. 40) by J. C. Whetzel, assistant to vice president, American Sheet & Tin Plate Co., Pittsburgh. It was discussed by W. Robert Shimer, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa., and Col. E. J. W. Ragsdale, chief engineer, railway division, E. G. Budd Mfg. Co., Philadelphia.

D. M. Petty, superintendent of service division, Bethlehem Steel Co., Bethlehem, Pa., spoke on "The Economic Importance of the Replacement of Obsolete Equipment in Steel Mills" (p. 45). G. Cook Kimball, vice president, Illinois Steel Co., Chicago and W. B. Gillies, vice president, Youngstown Sheet & Tube Co., Youngstown, participated in the discussion.

In the opinion of many institute meeting habitues, the banquet was more colorful and interesting than any of its predecessors since 1926 when Queen Marie and Prince Nicholas of Roumania were present. The Commodore ballroom was jammed with 1700 attentive members and guests.

EDGAR C. BAIN

Awarded Institute Medal

Mr. Bain's paper, "Some Characteristics Common to Carbon and Alloy Steels," presented at the May, 1934, meeting of the Institute won him the medal at last Thursday's meeting. Now assistant to the vice president of the United States Steel Corp., New York, Mr. Bain has been with the Corporation since 1928. The preceding four years he was research metallurgist for the Union Carbide & Carbon Corp. He is a graduate of Ohio State university, 1912, and is the author of numerous technical papers

The principal speaker was David H. Reed, former senator from Pennsylvania, who made a stirring plea that "sane Americans, whatever their party heretofore, may unite to support sound and honest candidates upon a sound and honest platform of political principle."

Dubbing his remarks as the "posthumous reflections of a political corpse" the former senator lost no time in assailing the activities of political demagogues. He declared that the tendency for men to blame not only their governors but also the governmental system for all the ills that beset them is not peculiar to this country, but has been common throughout the entire world in the past six years.

The speaker expressed his firm conviction that "recovery is coming soon, if we do not by unwise action postpone its arrival, and handicap its enjoyment, when it does come, by having piled up for ourselves a mountain of liability." He pointed out that recovery has come fastest in those lands, such as Australia, which have seen the futility of trying to legislate prosperity through destroying wealth and piling mountains of restriction upon the individual. He emphasized the fact that hard work and thrift are the only things that have ever lifted a nation out of depression. "Common sense in the end," he declared, "will win, and the wasters and tyrants will go back to the obscurity in which they belong."

Two Medals Awarded

Mr. Grace, who presided throughout the after-dinner program, presented the American Iron and Steel institute medal for 1934 to Edgar C. Bain, assistant to the vice president of the United States Steel Corp., New York, for his paper, "Some Characteristics Common To Carbon and Alloy Steel." The Gary medal was bestowed upon John B. Tytus, vice president of the American Rolling Mill Co., for "outstanding achievements in mill practice—for faith and vision in the future of American enterprise which enabled him to bring all his energy and determination to bear upon the problems of rolling steel—for his fine engineering skill and his application of it—particularly in his contributions to the development and successful operation of a method for continuous rolling of steel sheets."

Directors of the Institute re-elected officers for one year as follows:

President, E. G. Grace, president, Bethlehem Steel Corp.; vice presidents, W. A. Irvin, president, United States Steel Corp., and T. M. Girdler, chairman and president, Republic Steel Corp.; treasurer, William J. Filbert, chairman, finance committee, United States Steel Corp., and executive secretary, Walter S. Tower.

All standing committees of the Institute were re-elected by the board for another year, except for the following changes:

Charles R. Hook, president, American Rolling Mill Co., was appointed to the committee on foreign relations to succeed Mr. Grace. H. A. Roemer, president, Sharon Steel Hoop Co., was appointed to succeed S. E. Hackett on the committee on membership. B. F. Fairless, vice president, Republic Steel Corp., was appointed to the committee on tariff, succeeding Mr. Hook.

Grace for Caution on Wagner, Security, 30-Hour Week Bills

NEARLY two years ago the President of the United States asked for the co-operation of American business in his efforts toward recovery. The response was general and the steel industry in particular was one of the first to lend its complete co-operation.

Since August, 1933, we have endeavored to carry out in the utmost good faith the provisions of the steel code then formulated and subsequently revised. . . . The results are tangible. The industry is employing 420,000 workers, almost a peak-time force; wage rates are above the 1929 prosperity levels. An unbelievable degree of self-government has been attained within the industry. Yet in spite of these efforts we have failed to achieve the desired goal, namely, recovery.

Having done our part, we naturally ask why a greater degree of recovery has not taken place. I believe the chief barrier to recovery is political—the economic uncertainties underlying too many experiments and the proposals to regiment American business and labor.

Harnessed by Politics

Business is ready to go forward. It is being halted by undue emphasis on reform, unsound, biased and perhaps even unconstitutional legislative proposals, political maneuvering, unrestrained public expenditures, currency tinkering and increasing tax burdens.

There can be no disloyalty on the part of those who have whole-heartedly co-operated, if at the end of a reasonable period they point to the results and ask for a rational consideration of the facts to determine where we are going and to voice their opinion that additional experimenting will not cure, but probably will further delay recovery.

As a practical matter, permanent recovery will return only through business becoming profitable. Take our own industry. Given the demand we were never in a better position to forge ahead. The commercial structure has been purged of unsound practices. Consumers of steel products in planning their businesses now know where they stand. Our laboratories are diligently and effectively exploring the potentialities for new uses of steel. The relations between employes and management are cordial and co-operative. Large reservoirs of private capital stand ready to flow into private industry with a resumption in business. In a word, the internal economy of the steel industry was never better.

With a rise in the demand for steel all the elements will benefit. The real "forgotten man," the stockholder might again hope for a return on his investment. The outlook for the employe is better than at any time in the past. With his present wage rate the only thing that stands between the worker and a prosperous pay envelope is restricted hours of work.

Business men are not alone in viewing these proposals with apprehension. Workers, too, are becoming alive to the inherent dangers. They are beginning to realize that many of the proposals said to benefit them will in the long run adversely affect their interests. They are beginning to realize that there are subtle influences at work on a well planned program to alienate them from their employers. It is significant that this was one of the chief points stressed by the United States supreme court when it recently voided the railway retirement law. In delivering the majority opinion of the court, Mr. Justice Roberts said:

Herewith is abstracted the address of Eugene G. Grace, president, American Iron and Steel institute, at Thursday's general meeting.

"Assurance of security it truly gives, but, quite as truly, if 'morale' is intended to connote efficiency, loyalty and continuity of service, the surest way to destroy it in any privately owned business is to substitute legislative largess for private bounty and thus transfer the drive for pensions to the halls of Congress and transmute loyalty to employer into gratitude to the Legislature."

This opinion expresses the fundamental proposition which has made for many decades of successful industry in this country. It recognizes that peace and prosperity in industry rest upon the firm foundation of friendship and amity between employer and employe. If this fundamental truth were more generally appreciated, and if labor leaders and their sympathizers were by law held to accounting for their acts and the monies collected and disbursed, we would have far less meddling with business.

We stand squarely for the open shop. We know this to be for the best interests of employes, employers and the general public. We believe our workers should be protected in their right to belong or not to belong to labor organizations as a matter of personal privilege. We believe it to be our duty to protect them in this right. Moreover, we believe that it is the duty of the government to see that nothing is done to interfere with this, their constitutional liberty. We believe in the principle of collective bargaining, and have practiced it for many years.

For many years employes and management in a number of industries have dealt successfully through plans of employes' representation. These plans, where in effect, have kept industry singularly free from difficulties. They have promoted efficiency and morale and bettered the standards of living of the employes. The steel industry has been an outstanding example in this field.

Best for All Concerned

With our background of experience over many years under employes' representation, we know that this method of co-operative collective dealing is better for all parties concerned than is the old out-worn idea of strife and conflict with all of its attendant losses to the employe, the employer, and the general public.

Now we are faced with a vicious legislative proposal that seeks to discredit these plans, gives legislative backing to national irresponsible labor unions and invites the closed shop. I refer to the national labor relations act, commonly called the Wagner bill.

Here is a deliberate attempt to drive a wedge between the employer and his employes. Here is an attempt to do for national labor unions by law what they have been unable to do for themselves by appeals to workers who have resisted them at every turn. Eloquent proof of this can be found in the published record of less than 6000 duespaying members in the Amalgamated Association of Iron, Steel and Tin Workers out of more than 420,000 employes in the steel industry.

We would, indeed, be lacking in courage as managers and citizens if we stood idly by and did not vigorously oppose a proposition that is so biased and manifestly unfair to both employer and employe. It has, indeed, been properly characterized as a "bill to create trouble." I repeat it is one of the most vicious pieces of legislation that has been proposed in a long time. Whether or not this undesirable bill actually becomes a law, the constitutional rights of employes will continue. Their right of freedom of choice both in employment and in selecting representatives will be protected by the steel industry to the fullest extent of our ability.

Another disturbing legislative proposal is the bill limiting a worker to 30 hours a week service. The unsoundness of the 30-hour week is so

(*Please turn to Page* 68)

Machine Tool Builders Seek Termination of Their Code

THAT the machine tool industry already has started on a recovery of major proportions, that its NRA code and an unwise attitude of the federal government have retarded recovery thus far, and that an acute shortage of skilled labor will be experienced shortly, appeared to be the unanimous sentiment of members of the National Machine Tool Builders' association holding their thirty-third spring convention at the Edgewater Beach hotel, Chicago, May 21-23.

With a registration of approximately 155, one of the best in history, the association gave close attention to these and oher problems in two sessions and numerous group meetings.

Would Make Codes Voluntary

Concerning its code, the association went on record as recommending its termination on June 16 with expiration of the present NIRA act, and further recommended that in any future legislation codes be made voluntary rather than mandatory. This action was unanimous.

Presenting his presidential address, Charles J. Stilwell, vice president, Warner & Swasey Co., Cleveland, declared that the attitude of the government in Washington, its insane tirade against machines, and its control of hours, wages, labor relations and competition, are causing many uncertainties. Because these influences seem likely to continue, he urged the tool building industry to show less concern over what is taking place at the moment and to prepare for the problems which lie ahead.

Efforts of the association are directed toward improving executive management, engineering, production and marketing. In connection with marketing, he stated that the industry is not doing a good job of selling and he believes the association can lend assistance.

What is the matter with machine tool selling? Mr. Stilwell asked. In attempting to answer this question, he said that fundamental changes have taken place in selling. Up to 1929, the market was ever expanding, but at this point expansion stopped. Since then, tool builders have retained only their best personnel. Customers no longer need more machines to do more work; they need better machines to do better work.

He cited several examples to show that needs for new equipment are developing of their own accord in customers' plants, whereas tool manufacturers should be discovering these needs and selling the idea of equipment replacement. Selling is badly planned, and badly executed, in Mr. Stilwell's opinion.

The recent MAPI survey of American manufacturing equipment which must be replaced was referred to by Mr. Stilwell as indicating the potential market which sooner or later must be satisfied. He proposed the formation of a marketing study group to investigate and formulate the best methods for selling machine tools. In concluding, he expressed his belief that 1935 marks the beginning of recovery in the toolbuilding industry and the movement is well under way.

Submitting his report as general manager of the association, Herman H. Lind, Cleveland, informally reviewed the situation in Washington as it affects the industry. Passage of the Wagner bill by the senate came as an absolute surprise, for it was believed that industry, including the Tool Builders' association, had made a good case in its opposition. There is a strong feeling that the bill is unconstitutional.

Clearer View of Ethics

Mr. Lind explained that the machine tool code is based on NRA and that it will terminate unless the act is continued or unless special legislation is passed to continue codes in effect. Under its code, the industry has been able to talk more freely about ethics, and one-price policy, and he expressed hope that these advantages can be preserved.

Turning to the formal portion of his report, Mr. Lind stated that European industry has gone forward despite tremendous obstacles, consequently the same could be accomplished in this country. In the United States, goods must be sold at low price, and low price is dependent upon efficient management and equipment.

He recommended concentrated mass effort to show machine tool users what modern tools will do in the way of cost reduction and better products. While an aggressive effort for sales is being made, the profit viewpoint must not be lost. He urged also that services rendered to customers be charged for to return at least their cost, else they translate themselves into deductions from profits or additions to losses.

Dealing with the labor situation, Mr. Lind said: "The industry is short approximately 35 per cent of the skilled mechanics it employed in 1929. A backlog of orders that will permit giving workmen some assurance of steady employment will bring some unknown proportion of these back to the industry. However, we must recognize that all the men employed in 1929 are five years older, some will never return, some have lost a portion of their skill, and practically no new ones have been trained.

"Two procedures may be followed to care for this situation. The first is to take men from other plants, both within and without the industry. . . . The alternative lies in the development of one's own employes."

Mr. Lind recommended the selection of good men, though untrained and unskilled; a careful appraisal of all workmen now employed for their ability to assume more important work; and development of present skilled men as trainers of other men.

Old Tools More Numerous

At present, 65 per cent of machine tool equipment in American manufacturing plants is over 10 years old, according to Kenneth H. Condit, editor, *American Machinist*. In 1930, the figure was 48 per cent and in 1925 it was 44 per cent. This provides an index as to the potential market for machine tool replacement in the next few years.

The report of the treasurer was made by H. H. Pease, president, New Britain-Gridley Machine Co., New Britain, Conn.

In addressing members of the association at a luncheon meeting, Col. Frank Knox, president, *Chicago Daily News*, declared that the time factor in the present depression already has been met, but complete recovery is being held back because the durable goods industry has not begun to come back. Consumption industries are now operating at better than 90 per cent, while the durable goods industries continue at the low level. Idleness in the latter industries and lack of demand for durable goods must be overcome to effect progress. Col. Knox cited the unfavorable condition of agriculture as another depressing influence.

As remedial measures, the speaker advocated balancing of the national budget and effective and dependable stabilization of the currency. The silver policy, he claimed, has accomplished nothing except expanding mining operations.

Col. Knox charged that passage of the Wagner bill will create a special group in the labor field, and its being placed on the statute books would be the saddest thing that could happen to union labor with it, labor, which would cease to be free.

Col. Knox also protested against passage of the banking and federal

reserve bills as legislation which is preventing a return of confidence. In conclusion, he said there can be no speedy recovery unless the policies of the government are changed.

The formal dinner of the association was addressed by Dr. Alexander Sachs, economist, New York, the first chief of the bureau of research and planning under NRA.

At the second session on Thursday morning, various committees presented formal reports. R. M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill., reported for committee co-operating with the Machinery and Allied Products institute; General Manager Lind read the report of the committee on foreign trade; W. W. Tangeman, vice president, Cincinnati Milling Machine Co., Cincinnati, reported for the committee co-operating with government departments; and W. P. Kirk, vice president in charge of sales, Pratt & Whitney Co., Hartford, Conn., reported for the exposition committee.

Work with Federal Bureaus

The work on which Mr. Tangeman reported deals with the association's co-operation with departments of the federal government, particularly the army and navy, as to machine tool equipment which would be required should the country become engaged in war. Answering the government's question as to the production capacity of the machine tool industry, the committee has estimated present capacity to be between 10 and 15 per cent less than it was in 1930.

Presenting details of the third National Machine Tool show to be held in Cleveland, Sept. 11-21, Mr. Kirk stated that of 126,000 square feet of available exposition space in the Public auditorium, 90,000 square feet have been contracted for by members of the association and other machine tool manufacturers, and 22,000 feet have been taken by manufacturers of other types of machinery and accessories. Of the balance of about 14,000 square feet, only 7500 feet remains to be sold.

Recovery in the machine tool industry was the subject of an address by Mrs. Frida F. Selbert, secretary of the association, Cleveland. Through the use of a series of charts, she made it clear that the industry is in the strongest position to go ahead than it has ever been before. The statistics also showed that at present 70 per cent of the association members are operating at maximum hours permitted by the code and these plants are employing 85 per cent of all workers. The other 30 per cent of the members are operating at less than maximum hours and employ only 15 per cent of all workmen

A most enlightening address on costs and selling prices was presented by G. P. Torrence, president, Link-Belt Co., Chicago. The speaker made clear at the outset that the process of obtaining costs is an exact science. These costs are then broken down with considerable precision to such items as cost of product, cost of selling, overhead, etc.

Mr. Torrence reiterated the statements of previous speakers that there is a larger deferred demand for machinery than there ever has been in history. The goal of all machinery manufacturers, ultimately, he said, is 100 per cent operation with a profit. Matters to which machine tool manufacturers probably are giving attention today are improved products, advertising, increased sales effort and price adjustments, he stated. In connection with the problem of price adjustment, he declared that there is too great a temptation to reduce prices to obtain volume and a tendency to overestimate the savings which may come by virtue of the increased volume.

Furthermore, the speaker continued, there is a tendency in selling capital goods to confuse the economic value of price, as compared with selling consumer goods. In other words, capital goods are purchased for the service they render, thus a difference in selling price of 5 to 10 per cent matters little, for it is not a point of great concern whether the equipment is written off in one year or 13 months.

Ask Code End June 16

Several resolutions were submitted by O. B. Iles, president, International Machine Tool Co., Indianapolis, chairman of the resolutions committee. By far the most important was the one asking that the code expire on June 16.

In view of the approaching shortage of skilled labor, another resolution was adopted asking the board of directors to re-establish the committee on apprentice training, this committee to formulate such recommendations as may be necessary. A third resolution recommended that the board give serious consideration to President Stilwell's suggestion for a merchandising study and take early action.

Production

STEELMAKING slid back 1½ points last week, surrendering all the gain made in the first three weeks of May. Chicago, off 7½ points, contributed chiefly to this decline. Details follow:

Central eastern seaboard—Up 1 point to 29½ per cent last week, due particularly to better tin plate requirements and some recent releases on automotive steel.

Chicago—Touched the lowest level of the year to date at 44 per cent, a decrease of 7½ points from the preceding week. A steadier trend is seen for the next few weeks. Blast furnace schedules are unchanged, 14 of 36 steelworks stacks and 2 merchant furnaces being active.

Pittsburgh—Unchanged at 38 per cent last week, the rate being strongly supported by a leading independent and two of the smaller independent producers. The leading interest locally underwent a decline in operations last week by about four points to around the 30 per cent mark, due to lower operating schedules chiefly on structural shapes.

Wheeling—Off 5 points to 68 per cent last week, owing to the shutdown for an indefinite period by a small independent mill here. Twenty-five out of 37 open-hearth furnaces are now on, compared with 27 a week ago, and 30 two weeks ago.

Cleveland-Lorain—Up 3 points to 54 per cent, National Tube Co., Lorain, lighting its tenth open hearth; Corrigan, McKinney Steel Co., continuing with seven; Otis Steel Co. with four. The increase at Lorain is due largely to a strong demand for wire and wire products from the Cleveland mills of the United States Steel Corp.

Buffalo—Turned upward sharply last week to 37 per cent, with lighting of additional open-hearths. This rate is expected to continue through this week, with 14 open hearths making steel. While there may be some curtailment of finishing mill schedules because of the holiday no general suspension of production is contemplated.

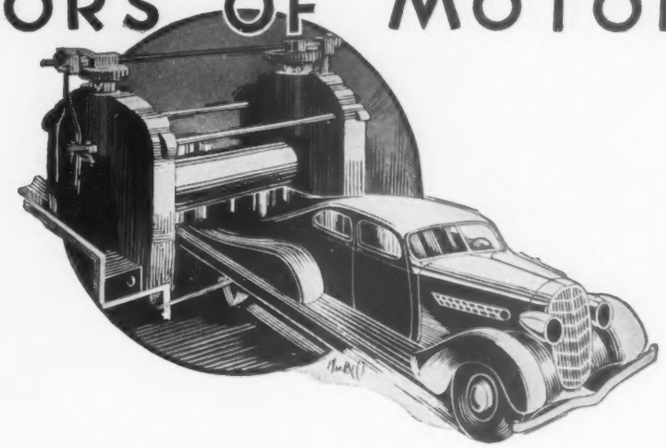
New England—Up 10 points to 60 per cent last week, and this rate is likely to be approximately held this week. A sharp drop is expected shortly, however, as one steelworks is planning to take off all ingot production for about two months during the summer, having built up substantial stocks of ingots.

Steelmaking Operations

Percentage of Open Hearth Ingot Capacity Engaged in 10 Leading Districts

	Week ended May 25	Change	Same week 1934	Same week 1933
Pittsburgh	38	None	51	27
Chicago	44	— 7½	62	37
Eastern Pa.	29½	+ 1	45	19½
Youngstown	50	None	61	47
Wheeling	68	— 5	74	80
Cleveland	54	+ 3	78	59
Buffalo	37	+ 5	50	33
Birmingham	54½	None	55	50
New England	60	+10	84	58
Detroit	94	None	100	38
	44	— 1½	57	43

MIRRORS OF MOTORDOM



DETROIT

NASH not only joins the steel top procession this week with the introduction of its new six, which at $675 to $790 is sandwiched in between the Lafayette and the Nash advanced six, but it also blazes a new trail in the manufacture of this type of top.

The Nash body, including the top, consist of four steel stampings. The top of the cowl, the windshield pillars and the roof as far back as the center door pillars is one stamping. The rear side quarters and the side roof crown panel as far forward as the center door pillars bring the number up to three. The rear half of the roof and the entire back panel is the fourth.

These four stampings are welded, and when the body is completed the seams, of course, defy detection. Destruction tests show that the welds can "take" as much as the sheets themselves. This type of top is distinct from the one-piece top made by Fisher for Chevrolet, Pontiac, Olds and La Salle, and the Hudson-Terraplane technique of welding a sheet into the place formerly occupied by the soft top.

Market for Equipment

The welded top probably will prove an "out" both for body interests and for moderate and small-volume automobile manufacturers. Not many manufacturers can offer the volume that would warrant either themselves or their body sources putting upward of $60,000 into a press capable of drawing tops out of one sheet. But welding three or four stampings achieves the same end.

One Ohio stamping interest has been sawing Fisher one-piece tops in two and welding a strip or gusset in the center, thus lengthening them for the General Motors export trade. This suggests a three-piece top—the front and the rear with a center strip inserted. This center strip, however, would have to be crowned in order to give the necessary rounded top contour. Manufacturers of welding equipment will do well to watch closely stamping interests doing body work.

At present, Hudson-Terraplane is the only all-steel body builder, since it has eliminated wood and has substituted a steel pan for wooden floorboards. The new Nash also has a pan, but it is not known this early whether any wood remains in the new body; presumably, Nash will spread this type to other Nash models and also to Lafayette.

The new V-12 moderate-price Lincoln is expected to have an all-steel body, including the top, and this points to a similar development for the 1936 Ford. Chrysler, Briggs, Murray—in fact, all car manufacturers and body builders, will hop on the bandwagon no later than the introduction of the next series. The new Cadillacs will put all General Motors in the steel-top classification.

Sweeping Changes by Chrysler

Chrysler, incidentally, is probably more active than its large contemporaries on new designs for 1936. Generally speaking, Chrysler lines will probably be out earlier than their competitors. For one thing, bodies will be more diversified this coming year, even at slightly greater die cost. Briggs is doing considerable experimental body work for Chrysler.

Last-minute decisions upsetting programs are common to the motor industry, but it would be surprising if Chrysler failed to do something radical in 1936 models in the way of transmissions. It is well along with a "fluid flywheel," whereby gear shifting becomes practically eliminated. This is entirely separate from the automatic clutch, which was taken off Chrysler lines this year.

Borg-Warner also has been laying the groundwork for bringing out a new type of transmission which utilizes both engine speed and torque. This mechanism has an arm on the steering column, not entirely unlike the Hudson-Terraplane electric hand. Borg-Warner is adapting this design in three types—for small, medium and high-price cars.

Chrysler is steadily swinging toward greater use of its mola (molyb-

Ford Profit $6,860,462 Or $12.94 Per Car in 1934

FORD last year made $6,860,462 or an average of $12.94 per car, not including any profits that were withdrawn by the three owners—Mr. and Mrs. Henry Ford and Edsel Ford.

The 1934 profit was the first since 1930. Over the past ten years, Ford has had an even break between profitable and losing years, and the net in the decade has been $76,532,224.

It should be understood that Ford financial statistics are approximations. The only insight into the company's operations is gained from the report required by the Massachusetts commissioner of corporations. Profits and losses are deduced from changes in the profit and loss surplus and reserve accounts, and dividends are not disclosed. The record for the past ten years is:

1925 profit	$115,078,383
1926 profit	75,270,895
1927 loss—Model T dropped..	42,786,727
1928 loss	72,221,498
1929 profit	81,797,861
1930 profit	44,460,823
1931 loss	53,586,000
1932 loss	74,861,644
1933 loss	3,480,331
1934 profit	6,860,462
10 yrs. balance on profit side	76,532,224

The Ford balance sheet as of Dec. 31, 1934, reads:

Assets: Real estate, $144,958,979; machinery, equipment, etc., $82,811,704; inventory, $63,634,223; cash, etc., $361,667,154; deferred charges, $4,093,500; total $657,165,560.

Liabilities: Capital stock, $17,264,500; accounts payable, etc., $49,527,680; reserves, etc., $10,096,989; profit and loss surplus, $580,276,391; total, $657,165,560.

denum) steel, and there will be few parts in the 1936 models not made of it. Incidentally, Chrysler is understood to be making Packard springs of this steel.

Chrysler is reported to be well along with the development of roller and ball bearings which are self-lubricating, in that oil is impregnated at the time of manufacture. Still another experiment by Chrysler has resulted in the production of an all-aluminum engine. Not even cylinder liners are used. The block is so light one man can lift it.

While at the moment there does not seem to be any immediate prospect of an all-aluminum engine going into commercial production, nevertheless it indicates the trend of thinking of automobile engineers. Stronger and lighter cars are their objective and they are veering to the viewpoint that weight is not an essential to roadability as such; that an extremely light car will hold the road adequately provided the weight is properly distributed.

Weekly Wage Unchanged

One explanation of the Ford increase in wages, lifting the daily minimum from $5 to $6, is that it may be a defensive move. Most of this year, Ford employes have been working six days a week. About a month ago, dealers passed the peak of their sales and used cars began backing up, with the result the 5-day week was restored.

This was equivalent to a reduction, so far as weekly earnings are concerned, just at the time a good deal of sentiment was being aroused, especially by Father Coughlin, for a livable annual wage. Also, the settlement of Chevrolet's strike at Toledo included a wage increase, which seems likely to spread throughout the industry.

It is not known that there is any wage dissatisfaction at the Rouge—any more than is always present among upward of 50,000 employes—but a daily rate of $6 for five days equals a daily rate of $5 for six days. Of course, it boosts the payroll at the rate of $25,000,000 a year. This will dent, but not completely eliminate, the Ford profit for 1935.

The history of Ford wages—minimums in every case—is as follows: 1914, increased from an average of $2.37 to $5; 1918, addition of a 15 per cent bonus; 1919, raised to $6; 1929, after the break in the stock market in October, made $7; 1931, reduced to $6; 1932, cut to $4; 1934, increased to $5; 1935, lifted to $6.

Ford production last week held at 35,000 units for the 5-day week. May production probably will be about 150,000, or 20,000 below April. The June schedule is 120,000 units.

Chevrolet last week was back almost to 6000 units daily, on a 5-day basis, and for the next few weeks at least assemblies will be on the basis of 130,000 a month. In June, Chevrolet may pass Ford, for the first time this year. Notwithstanding the sniping by competitors, Chevrolet dealers have heavy backlogs.

Chevrolet is now equipping some standard models with 19-inch wheels, which provides high clearance for use in undeveloped regions. The wheels are the wire spoke type, similar to the regular 17-inch ones.

Last year, Pontiac edged out Olds in point of sales, by 72,645 to 71,676, but now Olds is pulling ahead. Four-month sales this year by Olds total 67,000 and by Pontiac 61,000, with current production by Olds about 4700 weekly and by Pontiac 4500. Olds has a backlog of about 14,000 unfilled orders.

Protects Oil from Dust Storms

To meet the extraordinary service conditions in the Southwest created by dust storms, Olds is equipping all cars shipped into that area with a special oil bath air cleaner. A sump in the lower portion of the cleaner is filled with oil, and as air is drawn into the cleaner it passes through the oil in the sump.

Olds also takes some pride in the fact that 1489 men or over 28 per cent of its employes are more than 40 years old, refuting recent claims by labor leaders that the automobile industry tosses older men aside for younger ones. There are 68 who are past 60, and nine more than 70 years of age. A recent survey by Studebaker (current production 1500 weekly) shows the average age of its employes to be 39.84 years.

Nash production has jumped past 2000 units weekly, partly due to stocking dealers with the new six, previously mentioned. This series has a wheelbase of 117 inches, an X type steel frame, the hood and radiator grille are one piece hinged at the cowl and lifting upward from the front, there is a small door in the hood permitting access for oil and water without raising the entire hood and grille. There is no exposed manifolding, it being cored into the block.

Graham, which is considering putting its office employes on an hourly remuneration basis, assembled 500 cars last week. White-Indiana truck again directed attention to the bad labor situation in Cleveland, its plant being closed by a strike. Incidentally, White points out that of 34 separate car and truck making companies started in Cleveland, it is the sole survivor.

Other weekly production figures are: Hudson-Terraplane, 2500; Buick, 1700; Plymouth, 10,000; Dodge, 6200; DeSoto, 1200; Hupp, 300; Cadillac-LaSalle, 750; Lincoln, 45; Reo, 400; Willys, 450; Auburn, 200.

The industry as a whole assembled 100,705 units last week, against 89,750 a week ago. The peak this year was 110,970 in the week ended April 27, hence production is holding well, although undoubtedly tapering off. Ford, as previously noted, was steady last week at 35,000 units, General Motors increased 12,000—all in Chevrolet—to 36,000. Chrysler was

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,765
Feb.	105,447	230,256	340,544
Mar.	115,272	338,434	429,830
Apr.	176,432	352,975	*475,000
4 mo.	525,976	1,077,331	*1,538,139
May	214,411	330,455	.....
June	249,727	306,477	.....
July	229,357	264,933	.....
Aug.	232,855	234,811	.....
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

May 4	110,865
May 11	87,395
May 18	89,750
May 25	100,705

Financial

LUDLUM STEEL CO., Watervliet, N. Y., leads all steel companies, reporting thus far, in the ratio of earnings to capitalization in the first quarter. It barely nosed out the Otis Steel Co., Cleveland. The comparison follows:

	Total capitalization	First quarter earnings	Per cent earned on capitalization
Ludlum	$6,874,413	$230,157	0.0345
Otis	28,522,604	952,362	0.0344
Inland	96,106,870	2,465,796	0.026
National	145,908,156	3,367,632	0.023
Allegheny	16,972,224	324,146	0.018
Granite City	9,375,100	134,581	0.014
American R. M.	99,029,619	1,342,434	0.0136
Wheeling	99,604,827	934,571	0.009
Republic	236,677,990	1,834,235	0.008
Gulf States	26,714,976	30,149	0.001
Bethlehem	611,584,336	*607,298	0.001†
U. S. Steel	1,946,095,638	*2,173,801	0.001†
Sheet & Tube	191,328,247	*595,769	0.003†
J. & L.	169,426,764	*794,789	0.004†

*Deficit.
†Per cent lost on capitalization.

ARMCO PLAN IS APPROVED

American Rolling Mill Co., Middletown, O., received the approval of stockholders May 17 to its $25,000,000 financing program, of which $4,500,000 will be used for new mills, including a wide cold strip-sheet mill.

WINDOWS OF WASHINGTON

WASHINGTON

PRESIDENT ROOSEVELT turned his personal charm loose on congressional and labor leaders Friday, with the result that a compromise on both the NRA and Wagner labor-disputes bills loomed.

It was a vigorous sort of charm. There is no doubt that the extreme opposition of industry to the Wagner bill at last broke through White House barriers. Perhaps the threat of organized labor to stage a general strike, voiced at a mass meeting in New York Thursday night, helped to precipitate action.

At any event, events moved rapidly Friday both at the White House and Capitol. Representative Doughton, Democrat, of North Carolina, chairman of the ways and means committee, introduced in the House a joint resolution extending NRA for two years.

Into the White House streamed such notables as Secretary of Labor Perkins, Chairman Richberg of the industrial recovery board, Senator Wagner, President Green of the A. F. of L., and others. All around Washington was the report that amendments to the Wagner bill, appeasing industry, and a 2-year extension of NRA to April 1, 1937, had been agreed upon.

High Court Still To Be Heard

Meanwhile, over all this turmoil hovered the shadow of the Supreme Court. Before it recesses for the summer, June 3, it is expected to hand down the decision in the Schechter poultry case, which may have a revolutionary bearing on the legalistic concept of NRA.

Secretary of Commerce Roper also broke into the picture Friday. Emulating Father Coughlin, industry deluged him with thousands of telegrams, urging reconsideration of the Wagner bill, which industry fears would give the A. F. of L. a charter to impose the closed shop.

The picture late Friday afternoon thus appeared more favorable to industry than in a number of weeks. The worst that appeared possible was a Wagner bill much less hostile to industry, and an extension of NRA longer than the 10 months voted by the Senate. This is agreeable to steel leaders, provided some machinery for policing fair prices and trade practices is set up.

As introduced in the house, the Doughton bill provides that "no code of fair competition shall be established for any trade, industry, or subdivision thereof which is not subject to the federal power to regulate interstate and foreign commerce."

It was reported Friday that the provision in the Doughton resolution authorizing the President to provide for limited price fixing in codes where necessary, in his discretion, to prevent discriminatory price cutting, growth of monopolies, and waste of natural resources, will be deleted. A 90-day period for code review seemed possible.

Probably early this week the situation will be clarified. On Friday there was no clear view as to a compromise on the price and other important provisions. There was hope too that Monday, May 27, the Supreme Court ruling on the Schechter case would be handed down.

In any event, the tide of events late last week was much more favorable to industry, notwithstanding the cold reception meted out to the 1500 business men who trekked to Washington Wednesday to register their protests. The AAA bureaucracy chaperoned the 4000 embattled "farmers" who marched on Washington two weeks ago, but if any NRA officials consorted with the aroused representatives of industry Wednesday they wore beards.

GRADE CROSSING WORK TO COST $2000 PER YEAR A MAN

President Roosevelt let it be known last week that he considers allotments for grade crossing and highway projects, as part of the $4,000,000,000 work relief program, as mandatory. Between 25 and 50 per cent of all the money to be spent in each individual state will be used for these purposes.

The grade crossing program, he stated, will be at the rate of $2000 per year per employe—by which he explained that with the material needed for the grade crossings it will reach that amount for all of the persons put on that kind of work; whereas it has been estimated by government officials that on other projects expenditures will be about $1000 a year per person employed, which also includes materials. The purpose of the statement was to explain that the grade crossing program is perhaps the most expensive of any that will be undertaken by the government under the entire program.

For distributing the cost of grade crossing and highway work, for which $400,000,000 has been appropriated, a standard formula has been adopted: 7/24ths on the basis of area, 7/24ths on the basis of post road mileage, and the other 10/24ths on the basis of population.

CAPITAL STIRRED BY TALK OF CENTRAL PURCHASING AGENCY

There is a lot of underground conversation to the effect that iron, steel and other commodities to be used in the work relief program may all be purchased by the government from Washington.

In fact, the President at a recent press conference intimated that such a method might be tried. However, representatives of the iron and steel industry who are permanently located here see many reasons why this will not work out satisfactorily.

Up to the time this is written no move has been made in that direction. It is true that TVA purchases are made in bulk at Knoxville, Tenn., but all of this material is to be used in that particular vicinity, while

under the work relief program, projects will be located in every part of the country.

The reason, of course, for purchasing the material here would be, according to theories of government experts, that larger quantities could be bought at one time and therefore prices would be lower.

There are a good many obstacles in the way of such a scheme, however. It is pointed out by one highway expert that provision is made in the work relief bill that highway expenditures shall be made in accordance with the existing highway acts and these provide, for one thing, that purchases shall be made by each state highway purchasing agent.

If such a central purchasing agency should be established it is a foregone conclusion that Rear Admiral Christian J. Peoples, paymaster general of the navy and director of the procurement division of the federal emergency administration of public works, would be at the head of such agency, with Capt. Harry Collins, assistant to Admiral Peoples, being the second in command who would probably do the actual purchasing.

MANGANESE PRODUCERS NOW ASK CONGRESSIONAL PROBE

A congressional investigation of the domestic manganese situation, including the proposed 50 per cent reduction in the manganese ore duty under the Brazilian trade agreement, and the source of the state department's information on manganese has been asked by producers in a letter from J. Carson Adkerson, president of the American Manganese Producers association, to Sen. James E. Murray, chairman of the special manganese committee. Said Mr. Atkinson:

"Steel companies consistently over a period of years refused to buy domestic manganese ore and paid an average of $4.10 per ton more for foreign manganese ore than for domestic ores of a similar or higher grade. The purpose behind this was to suppress domestic production and bring about a reduction in the manganese ore duty, such as is now being negotiated through the state department."

Domestic producers are recommending to the President that he withhold final ratification of the Brazilian trade agreement until the manganese facts are determined.

TREASURY VERSION OF VINSON ACT CUTTING NAVY PROFITS

Shipbuilders and suppliers of raw material to the navy are much upset over the Vinson act, one of the provisions of which limits the profit on navy contracts to 10 per cent.

Individuals in the bureau of internal revenue are making interpretations covering items which may not be included in establishing the cost on which the profit is to be based.

Up to this time these rulings have been that selling expenses, federal income taxes, state income taxes, allowance for interest on invested capital, interest on borrowed money, and interest on funded indebtedness, are not part of the cost of performing the contract, and that administrative expenses and salaries impossible to apply directly to product are subject to audit.

Those who have been watching this matter state that the practical effect of eliminating these standard charges used in all organized business practice and necessary to maintain solvency is to bring the real profit down to between 4 and 5 per cent.

They believe that there is no question but that as time goes on other items will be excluded, and that ultimately there will be no profit left, unless the internal revenue bureau officials can be made to see the situation as it would be viewed through the eyes of any business man.

Basing Points

MORE than a score of large users of steel in the Chicago district recently filed a formal petition with the American Iron and Steel institute, New York, requesting a revision of the basing point situation to place Chicago and Gary, Ind., on the same basis as Pittsburgh. At present most Chicago and Gary basing prices are $1 to $2 a ton over Pittsburgh.

Merger

JONES & LAUGHLIN STEEL CORP., Pittsburgh, has announced the extension of its warehouse and steel fabricating facilities with the acquisition of National Bridge Works, Long Island City, Long Island, N. Y. The new division will be known as National Bridge Works division of Jones & Laughlin Steel Service Inc., the latter in turn a subsidiary of Jones & Laughlin Steel Corp.

Harry B. Royer, formerly president of National Bridge Works, will be manager of the subsidiary division. The National Bridge Works division has a rated capacity of about 1000 tons of fabricated structural steel per month.

MERGER APPEAL NOT SETTLED

Attorney General Cummings said in Washington Friday he had not yet decided to appeal the decision of Judge Raymond in Cleveland, May 3, against the department of justice in its suit to prevent Republic Steel Corp. acquiring the Corrigan, McKinney Steel Co. (Steel, May 6, p. 14)

Meetings

ON THE program of the first annual meeting of the gray iron foundry industry, under auspices of the Gray Iron Founders' society, to be held in Cincinnati, June 6 and 7, at the Hotel Gibson are: James W. Hook, president, Geometric Tool Co., New Haven, Conn.; F. R. Hoadley, vice president, Farrel-Birmingham Co. Inc., Ansonia, Conn., also president of the society; R. D. Phelps, vice president, Francis & Nygren Foundry Co., Chicago; F. A. Lorenz Jr., vice president, American Steel Foundries, Chicago; Robert W. Irwin, president, R. W. Irwin Co., Grand Rapids, Mich.; Peter E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O.; Hyman Bornstein, Deere & Co., Moline, Ill.; W. H. Winters, vice president, American Brake Shoe & Foundry Co., New York; Frank W. Carter, president, Fillmore Foundry Inc., Buffalo; W. H. Hoppenjans, president, Starr Foundry Co., Covington, Ky.; A. C. Ziebell, secretary, Universal Foundry Co., Oshkosh, Wis.; Walter L. Seelbach, secretary-treasurer, Forest City Foundries Co., Cleveland; and C. B. Magrath, president, North Western Foundry Co., Chicago.

SPEAK AT FOUNDRY MEETING

Speakers at the third regular meeting of the northeastern chapter of the American Foundrymen's association in Cleveland, May 16, included Robert E. Kennedy, Chicago, technical secretary of the A. F. A.; L. W. Olson, Ohio Brass Co., Mansfield, O.; B. D. Fuller, Cleveland; J. D. Goldie, foundry instructor, Cleveland trade school; and S. C. Black, works manager, Willys-Overland Co., Toledo, O.

Machinery Club Reopened

The Machinery Club of Chicago, inactive during the past few years, has been revived and new quarters have been taken in the Machinery Sales building. The club will occupy the entire first floor. Clyde W. Blakeslee, of N. A. Strand & Co., Chicago, has been elected president. Mr. Blakeslee was the first president of the club when it was organized in 1916. The organization at one time had a membership of about 1000, but closed its quarters several years ago.

Algoma Steel Reorganized Under Same Name

Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont., in receivership since June 20, 1932, has been reorganized and taken over by a new company with the same corporate name.

The new company assumes all the

liabilities of the receivers and managers and preference and common stock is being issued to bondholders under terms of the agreement.

Following are the officers: Chairman and president, Sir James Dunn, Bart, London, England; first vice president, W. C. Franz; second vice president, John A. McPhail; director and general manager, T. F. Rahilly; secretary, William Jeffrey; treasurer, E. W. Shell; and comptroller, E. Carey. All except Sir James are at Sault Ste. Marie.

Messrs. Franz and McPhail and Sir William E. Stavert, of Montreal, Que., have been the receivers.

Died:

M W. McARDLE, 60, president, Chicago Flexible Shaft Co., Chicago, in that city, May 16. He was graduated from the University of Wisconsin in 1901 and had been identified with Chicago Flexible Shaft for the past 30 years, as president since 1928.

♦ ♦ ♦

George H. Cressler, 55, vice president and general sales manager of the Stacey Mfg. Co., Cincinnati, May 21.

♦ ♦ ♦

Howard M. Brooks, 49, vice president of the Alabama Fuel & Iron Co., Birmingham, Ala., coal producer, in Birmingham, recently.

♦ ♦ ♦

George C. Hildebrandt, 38, southern representative for the Stanley Tool Co., New Britain, Conn., at his home in Atlanta, Ga., May 16.

♦ ♦ ♦

Fred R. Klein, vice president and general manager of the Klein-Logan Co., Pittsburgh, tool manufacturer, in Pittsburgh, May 4.

♦ ♦ ♦

Stuart Mannell, head of Stuart Mannell & Co., importers and exporters, in Seattle, May 15. He was widely known in the steel trade of the Pacific coast.

♦ ♦ ♦

William J. Wiseman, 64, secretary and treasurer of Booth & Flinn Co., Pittsburgh, in that city, May 16. He had been with Booth & Flinn since 1889.

♦ ♦ ♦

William J. Bell, 70, assistant purchasing agent for the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., and for the past 20 years connected with the company, in Birmingham, May 14.

♦ ♦ ♦

George W. Wilson, 77, associated with the steel industry in Canton, O., since 1893, in Canton, May 23. With 12 associates he organized the Canton Rolling Mill, later acquired by the American Sheet & Tin Plate Co.

Industrial Men In Day's News

William H. Lake, General Manager of Sales, Follansbee Bros. Co.

For over three decades he has been active in sales and operating departments of this producer.

Since 1917 he has been in charge of one or both of the company's plants, along the Ohio river.

The past year his headquarters have been in New York, but in his new post he returns to Follansbee.

WILLIAM H. LAKE, recently appointed general manager of sales for Follansbee Bros. Co. Inc., Follansbee, W. Va., has had an active career of more than 30 years with this company. His experience has been in both the operating and sales departments.

Born in 1888, he first became affiliated with Follansbee in September, 1904, a few days after the company had begun rolling its first tin plate in the Follansbee plant.

In subsequent years he served in various capacities in the mill, most of the time under the direction of the former manager, Thomas H. Rogers, and in 1917 was appointed night superintendent.

In 1932 Mr. Lake was appointed manager of both the Follansbee plant and the Toronto, O., division. Two years later, in 1934, he was transferred to the New York sales office of the company.

In his new position he will make his headquarters at Follansbee, and succeeds C. A. Wilson as general manager of sales.

♦ ♦ ♦

Arthur H. Young, vice president, United States Steel Corp., New York, was awarded the Henry Laurence Gantt medal "for outstanding and creative work in the field of industrial relations" at a dinner of the Institute of Management, May 24.

♦ ♦ ♦

A. M. Candy, authority on arc welding, has been appointed consulting engineer on the staff of the Hollup Corp., Chicago, manufacturer of welding wire and supplies. He will be engaged in development of welding machines and improved welding practice in the company's research laboratories. For many years he has been associated with the engineering department of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

♦ ♦ ♦

R. S. Read, of the Halcomb Steel Co., Syracuse, N. Y., was elected president of the Electric Metal Makers Guild at its second technical meeting at Huntington, W. Va., April 12-13, at which A. E. Kayes, retiring president, presided.

Joseph A. Scott, of the Driver-Harris Co., Harrison, N. J., was elected vice president, and J. H. Chivers, of the Park works of the Crucible Steel Co. of America, Pittsburgh, was chosen secretary-treasurer.

On the technical programs were Joseph A. deBondy, Manitoba Steel Foundries Ltd., Selkirk, Man., and E. J. Hergenroether, International Nickel Co., Detroit.

♦ ♦ ♦

C. M. Carmichael, general manager, Shawinigan Chemicals Ltd., Montreal, Que., has been elected chairman of the Montreal chapter of the American Society for Metals.

Dr. A. Stansfield, head of the department of metallurgical engineering, McGill university, is honorary chairman. G. W. Scott, foreman, tool and machine shop, Northern Electric Co., is vice chairman. A. T. Sargent, office manager, Bethlehem Steel Co., is honorary treasurer. Miss B. W. Brownrigg, secretary, Donald Hunt Ltd., is recording secretary.

♦ ♦ ♦

A. C. Olander has been named sales

engineer for the South Bend Lathe Works, South Bend, Ind.

♦ ♦ ♦

Leon G. Antonsen has been appointed enameling superintendent for the Renown Stove Co., Owosso, Mich.

♦ ♦ ♦

Frank J. Kane, employment manager of the American Brass Co. Buffalo plant, has been elected president of the Industrial Relations association of Buffalo.

♦ ♦ ♦

Donald Loyhed has been appointed Cleveland representative, with office at 7500 Euclid avenue, by the Read Machinery Co. Inc., York, Pa., manufacturer of mixers for the chemical and industrial trade.

♦ ♦ ♦

P. J. McCarty has been named sales engineer in the New England territory by SKF Steels Inc., New York. For a number of years he has been connected with the Ludlum Steel Co.

♦ ♦ ♦

O. W. Irwin has been appointed manager of the concrete bar bureau, a newly created division of the general sales department of Carnegie Steel Co., Pittsburgh. He was associated for many years with Truscon Steel Co., Youngstown, O., as vice president in charge of reinforcing bar and steel joist sales. He was also instrumental in organizing both the Concrete Steel Reinforcing institute and the Steel Joist institute, being

O. W. Irwin

president of the former from 1931 to 1933 and secretary of the latter group for a number of years.

♦ ♦ ♦

Roy C. Kendall, formerly representing the Medart Co., St. Louis, has been appointed sales manager of the company. Prior to his association with Medart, he was with the Link-Belt Co. for over 15 years.

♦ ♦ ♦

Harry O. Ames, formerly with Crane Co., Chicago, has joined the sales force of the Rawlplug Co. Inc., New York, manufacturer of anchoring devices. He will have charge of the Oklahoma territory, headquarters at 1028 Twelfth street, Oklahoma City.

♦ ♦ ♦

D. B. Perry has been elected president of the Morse Chain Co., Ithaca, N. Y., and Detroit, division of the Borg Warner Corp. Other officers include: Vice president, general manager and treasurer, C. J. Kenerson; secretary and assistant general manager, N. K. Van Osdol; assistant secretary and assistant treasurer, S. B. Waring; and sales manager of the automotive division and manager of the Detroit plant, Frank M. Hawley.

♦ ♦ ♦

Albert C. Bruce, president of the United States Hoffman Machinery Corp., has been named to the board of directors of Worthington Pump & Machinery Corp., Harrison, N. J.

♦ ♦ ♦

Edward L. Ryerson Jr., president of Joseph T. Ryerson & Son Inc., Chicago, has been elected a director of the New York Life Insurance Co.

♦ ♦ ♦

R. L. Ferguson, recently associated with the Mt. Vernon Furnace & Mfg. Co., is now assistant superintendent at the Peerless Enamel Products Co., Belleville, Ill.

♦ ♦ ♦

Harry Fenner, purchasing agent and traffic manager of the Cincinnati Shaper Co., Cincinnati, has been named a vice president of the National Association of Purchasing Agents.

♦ ♦ ♦

Maurice F. Holahan, recently vice president in charge of domestic and Canadian sales for the International Harvester Co., Chicago, has been made first vice president, succeeding Sydney G. McAllister, who a short time ago was elected president. Mr. Holahan has been identified with the farm implement industry since 1892, having been made manager of the International Harvester's Atlanta branch in 1903. He was transferred to the general office in Chicago in 1919 and was made a vice president in 1933.

Fowler McCormick has been elected second vice president and continues in charge of foreign sales.

Charles R. Morrison who has been director of domestic and Canadian sales, has been elected vice president.

John Morris Jr. also has been elected a vice president, having charge of purchasing, traffic and fiber.

♦ ♦ ♦

Palmer Langdon has been appointed to the reseach staff of the Lea Mfg. Co., Waterbury, Conn., manufacturer of buffing and polishing compounds. He will have charge of a research project started a year ago,

Ambrose Swasey (center), 88-year-old founder and chairman of the Warner & Swasey Co., Cleveland, is shown presenting gold watches to Philip E. Bliss (left), president of the company, and to Charles J. Stilwell (right), vice president, in recognition of 25 years' service with the organization. Mr. Bliss started with the company in 1910 as an accounting clerk, becoming cashier in 1912, then auditor and treasurer, director in 1919, and president in 1928. Mr. Stilwell also started in 1910, as an apprentice. After representing the company in New York and Europe he was made assistant to the vice president in 1916, foreign sales manager shortly after the close of the World war, sales manager in 1922 and vice president in 1929. He is now president of the National Machine Tool Builders' association

involving abstracting and indexing all available literature published since 1900 pertaining to buffing and polishing.

♦ ♦ ♦

Howard V. Clark, who has been junior assistant district sales manager at Detroit for the Carnegie Steel Co., Illinois Steel Co. and Tennessee Coal, Iron & Railroad Co., subsidiaries of the United States Steel Corp., is now assistant manager of sales. This follows recent appointment of P. M. Guba as district sales manager at Detroit, succeeding William B. Weston, now in Pittsburgh for the Carnegie company.

Born Feb. 12, 1899, at White Plains, N. Y., Mr. Clark was graduated from the naval academy at Annapolis in 1920 and from the Harvard law school in 1925. In July, 1927, he entered the structural department of Carnegie at Pittsburgh. In May, 1929, he was transferred to the bar bureau. From August of that year to August, 1930, he was a representative of the bar and hoop department. In the latter year he went with the Great Lakes Steel Corp., Ecorse, Mich., now a part of the National Steel Corp., re-entering the employ of Carnegie in Detroit, Sept. 1, 1932. The following year he was made an assistant district sales manager.

Howard V. Clark

♦ ♦ ♦

Frank J. Frey, vice president of the Geuder, Paeschke & Frey Co., Milwaukee, has been elected president to succeed the late Charles A. Paeschke. He has been identified with the firm, founded in 1880, since 1883. He continues also as treasurer.

Charles Paeschke Jr. is vice president and secretary, and Frank Frey Jr. vice president and production manager.

1934 Pig Iron Output up 20 Per Cent

PRODUCTION of pig iron and ferroalloys in the United States in 1934 made a gain of 20.9 per cent over 1933, according to the American Iron and Steel institute. Pig iron output was 15,676,889 gross tons in 1934, compared with 13,000,719 gross tons in 1933; ferroalloys totaled 461,684 gross tons in 1934, against 344,883 tons in 1933.

After standing in first place in pig iron production for two years, Ohio was passed by Pennsylvania last year, Ohio output totaling 4,207,944 tons and Pennsylvania 4,244,566 tons. Pennsylvania produced 27 per cent of the total and Ohio 26 per cent, these two states thereby accounting for more than half the total production. Other producing districts remained in the same sequence as in preceding years.

First half of 1934 was by far the most active period, producing 9,926,956 gross tons of pig iron and ferroalloys, while the final half turned out only 6,211,617 tons. Relative proportions of merchant and non-merchant iron were little changed, 13,013,175 gross tons of the total being produced for maker's use and 2,663,714 gross tons for sale. In ferroalloys the case was reversed, 122,752 gross tons being for maker's use and 338,932 tons for sale.

PRODUCTION OF PIG IRON AND FERROALLOYS IN 1934

By States

PIG IRON	1930	1931	1932	1933	1934
Pennsylvania	9,967,618	5,037,672	2,103,180	3,728,839	4,244,566
Ohio	6,688,658	4,120,610	2,387,028	3,918,723	4,207,944
Indiana, Mich.	3,934,212	2,327,839	1,034,801	1,469,783	2,184,546
Illinois	3.344,631	1,964,735	919,280	1,012,676	1,269,154
Alabama	2,382,221	1,640,851	652,898	900,170	1,171,650
Mass., New York	2,008,812	1,149,677	624,141	665,928	1,053,257
Md., Va., W. Va., Ky., Tenn.	1,922,314	1,419,987	680,774	1,143,600	1,318,964
Minn., Iowa, Colo., Utah	772,441	296,408	147,562	161,000	226,808
Total	31,020,907	17,957,779	8,549,664	13,000,719	15,676,889
FERROALLOYS					
Pennsylvania	337,268	195,552	85,194	163,798	164,776
New York, N. J.	202,622	125,597	85,875	98,857	140,711
Ohio, Ill., Iowa, Colo.	148,492	89,352	41,510	63,386	116,402
Md., Va., W. Va., Ala., Tenn.	42,880	58,074	19,210	18,842	39,795
Total	731,262	468,575	231,789	344,883	461,684
Grand total	31,752,169	18,426,354	8,781,453	13,345,602	16,138,573

PIG IRON MADE FOR SALE IN 1934

By Grades and States

States	Basic	Bess. and low-phos.	Foundry	Malleable	Forge	All other	Total
New York	96,678	64,867	210,454	162,404	2,141	.....	536,544
Pennsylvania	128,994	81,936	151,976	68,481	16,833	.....	448,220
Md., W. Va., Ky., Ala., Tenn.	72,690	6,177	524,899	.....	1,779	11,549	617,094
Ohio	232,124	21,244	162,232	308,779	.....	.....	724,379
Ind., Illinois	122,157	4,363	16,966	135,331	.....	.....	278,817
Mich., Iowa, Colo., Utah	1,869	.....	53,399	.....	.....	3,392	58,660
Total	654,512	178,587	1,119,926	674,995	20,753	14,941	2,663,714

PRODUCTION OF PIG IRON AND FERROALLOYS IN 1934

For Sale and for Maker's Use

PIG IRON	For sale	For maker's use	Total
Basic	654,512	9,447,232	10,101,744
Bessemer and low-phosphorus	178,587	3,252,702	3,431,289
Foundry	1,119,926	145,248	1,265,174
Malleable	674,995	152,156	827,151
Forge or mill	20,753	57	20,810
White and mottled, direct castings, etc.	14,941	15,780	30,721
Total	2,663,714	13,013,175	15,676,889
FERROALLOYS			
Ferromanganese and spiegel	68,954	116,879	185,833
Ferrosilicon	234,526	5,439	239,965
Other ferroalloys	35,452	434	35,886
Total	338,932	122,752	461,684
Grand total	3,002,646	13,135,927	16,138,573

Scrap Export Conference Is Continued; Trade Defended

SCRAP iron exporters will continue to meet as a conference of the industry, under the name of American Scrap Exporters conference, it was decided at a meeting of the scrap export industry, May 21, at India House, New York, as part of the celebration of "foreign trade week," sponsored by the United States chamber of commerce.

Benjamin Schwartz, who presided at the conference, was authorized to appoint a committee of nine, representing all important export points, to act as an advisory board. More

Benjamin Schwartz

than 75 scrap exporters from New York, Boston, Philadelphia, Norfolk, Baltimore, Jacksonville, New Orleans, Los Angeles and other shipping points, were present, in addition to representatives of foreign companies, and the following official government representatives: Sadao Iguchi, consul general of Japan; Romolo Angelone, commercial attache of the Italian embassy and R. B. Stevens, representing the British embassy.

Ralph L. Harding, chief of the metals and minerals division of the department of commerce, in the principal address, discussed the economic soundness of exporting scrap iron and steel. Pointing out that over 1,800,000 tons of scrap were exported last year, and that the exports for the first quarter of this year, in the amount of 560,000 tons, was establishing another record. Mr. Harding stated that a large share of our exported scrap is collected in the immediate vicinity of ports and that these areas are too far removed from the centers of the steel industry to make the scrap economically available for use in our own steel production.

Mr. Harding declared that scrap exports in 1934 represented approximately 12 per cent of the total scrap consumption in the United States and that over a period of 20 years since 1914, when the steel industry of this country consumed a total of about 337,000,000 tons of scrap, the percentage of scrap exports represented only approximately 1.7 per cent.

"It would seem not unreasonable," declared Mr. Harding, "to conclude that the working of natural forces, aided, it is to be hoped, by sincere co-operation between the industries directly affected, will automatically bring about a balance that will be both beneficial to the interests involved and economically sound in its relation to the conservation of our natural resources in raw materials.

World Opportunity Is Offered

"Having an almost unprecedented publicity opportunity, the scrap exporters of this country will not, I am sure, be slow to avail themselves of it to the fullest extent, realizing that, as never before, theirs is now the opportunity to sell the world on fair, honest, and wholly reliable trading—to give all and sundry to understand that when they buy American scrap they get what they order, in grade and quantity specified, and get it when they want it.

"If the scrap export industry does that, it will establish itself in the very front rank of industry, here and abroad. I believe, therefore, that it would be definitely constructive, as well as protective of your best interests, to actively cooperate in an effort toward maintaining the highest possible merchandizing standards in all of your dealings."

Mr. Schwartz, director general of the Institute of Scrap Iron & Steel Inc., in a summary of the scrap export trade, pointed out that scrap today is the principal raw material used in the manufacture of steel throughout the world, for two reasons:

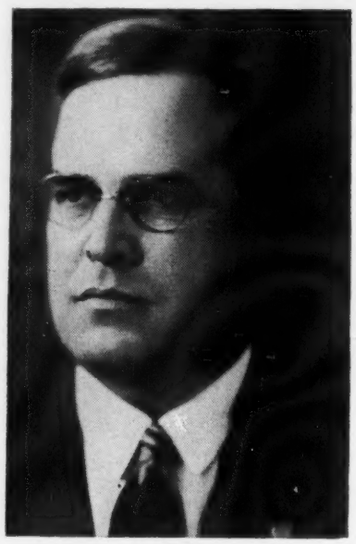
1. The development of the open-hearth process of manufacturing steel requires substantial tonnages of scrap in order to produce steel economically. The use of scrap in steel manufacturing is approximately 50 per cent scrap against 50 per cent pig iron, with the percentage of scrap running as high as 70 per cent in certain countries.

2. The conservation of iron ore and other natural resources brought about by the use of scrap, has caused countries with limited iron ore reserves to scour world markets for available scrap.

Mr. Schwartz pointed out that the large increase in the scrap exports was, in his opinion, a temporary condition caused by the following reasons:

1. The United States is the greatest industrial nation in the world today and produces an abundance of scrap. When the scrap is not greatly in demand for domestic purposes it is a natural development that scrap should move out of our abundance in international commerce.

2. The depreciation of the dollar had increased the purchasing power



Ralph L. Harding

of foreign monies. When exchanges are stabilized, we may expect a more normal situation in scrap exports.

3. Although the United States is the leading producer of steel, it is operating at approximately 45 per cent of steel capacity against approximately 100 per cent of capacity in Japan, Italy, and Great Britain. When the American steel production is increased, the export movement will stabilize itself.

Mr. Schwartz also pointed out that the export movement has prevented hundreds of small businessmen from going into bankruptcy; that last year the collection and preparation of 1,800,000 tons of exported scrap represented over 12,500,000 hours of labor, with a payroll of over $4,000,000.

"It is estimated," declared Mr. Schwartz, "that not more than 10 or 15 per cent of total steel production

(*Please turn to Page* 95))

EDITORIAL

Why Industry Expresses Conflicting Views on NIRA

AT FIRST glance the sharp division of opinion in Washington and in industry as to whether the national industrial recovery act should be abandoned or extended for two years seems difficult to explain.

The government administration is making a strong fight to induce congress to pass a bill which would continue the act for two years. The senate, apparently hostile to this proposal, has passed a bill which would continue the blue eagle, in modified form, until April 1, 1936. Donald Richberg and others who are urging that the life of the bird be prolonged for two years assert that mere extension to April is equivalent to pronouncing its death warrant. This undoubtedly is true, and presumably it is precisely what the senate desires.

In the house, whose members are not quite so antagonistic to NIRA, there is a chance that the recommendations of the administration for a two-year extension will be received more favorably. The influential ways and means committee of the house now is holding hearings on a bill which would provide the desired two-year extension.

Congress and Industry Both Sharply Divided On Value of NIRA to Business Recovery

Thus congress apparently is divided into two camps. One side would abandon NIRA and the other would preserve it for at least two years.

Surprising as it may seem, the confusion in congress is no greater than that which prevails in industry. A number of industrial groups have gone on record as definitely opposing the continuance of NIRA. Others have passed resolutions expressing the opposite view. On Wednesday about 1500 representatives of business and industry went to Washington to ask congress to support the President in his stand for a two-year extension.

The fact that one branch of industry may favor NIRA while another branch may oppose it is understandable. Codes have worked much better in some industries than in others. But it is hard to understand why marked difference of opinion should exist among members of a cohesive industrial group.

Members of a garment manufacturers' association were asked, "Do you want a two-year extension of an improved, enforceable NIRA?" The votes numbered 203 for "yes" and 226 for "no." The National Metal Trades association queried its members: "Do you favor a continuance of NIRA?" Fifty, or 8 per cent, voted "yes"; 479, or 76.7 per cent, voted "no."

Another puzzling aspect of the diversity of opinion on NIRA is that industrial representatives who personally are opposed to the act will express themselves as favoring it when they are talking publicly and officially on behalf of their companies. In other words, a confidential poll of an industry might show an overwhelming majority against NIRA, yet in an official meeting of the trade association of this industry the same individuals probably would vote to continue NIRA.

Temporary Expedient Favored While Longer Imposition Is Not Deemed Desirable Policy

This seeming inconsistency suggests insincerity on the part of industrial executives whose private opinions do not jibe with their official statements and actions, but this is not the correct explanation. It is more likely that the joker in this and perhaps most of the other paradoxical aspects of the confusion over NIRA is that one's opinion is influenced by the perspective from which he views the act.

For instance, industrialists, with few exceptions, are not in sympathy with NIRA as a long-term proposition, yet many of them favor it as a short-term expedient. When a man voices an opinion privately, he is apt to answer in terms of his belief from long-range perspective. When he is obliged to speak or act publicly and officially, his duty to his company's interests seems to dictate that he speak or act according to the short-term implications of the problem.

We believe this explanation fits the situation in many branches of the iron, steel and metalworking industries. Many executives who do not favor NIRA in principle find themselves defending it as an expedient because they shudder at the consequences of a sudden return to ruthless competition or because they fear that if NIRA is abandoned, the government administration and congress will replace it with something infinitely more objectionable.

This country will not witness a clear-cut, dependable expression of opinion on the real value of NIRA until the government administration merits the confidence of industry.

THE INDUSTRIAL DIAL

Published in the last issue of each month as part of
The Business Trend Section of STEEL
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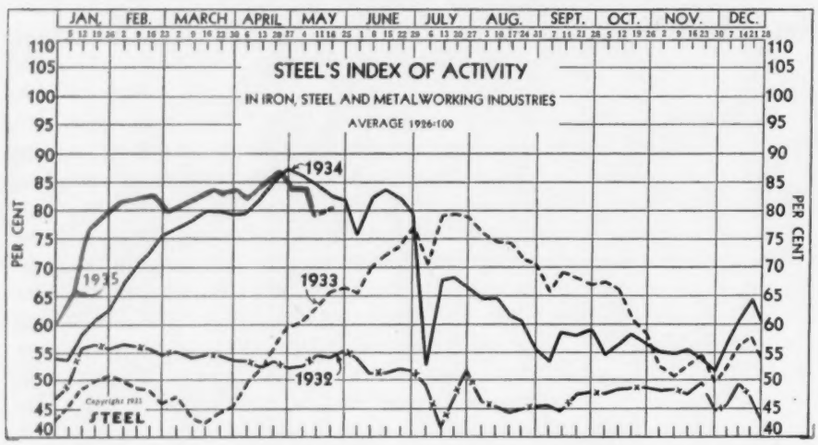


STEEL'S *index of activity in the iron, steel and metalworking industries gained* 1.2 *points to* 80.5 *in the week ending May* 18:

Week ending	1935	1934	1933	1932
Mar. 23	84.0	79.7	44.6	53.5
Mar. 30	84.3	79.3	45.2	53.4
April 6	83.4	79.6	49.1	52.6
April 13	85.4	82.2	52.6	53.4
April 20	26.3	85.0	55.8	52.3
April 27	84.9	87.5	59.5	52.5
May 4	84.6	86.0	60.3	54.7
May 11	79.3†	84.4	62.5	54.3
May 18	80.5*	82.4	65.2	55.1

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). *Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings power output and auto assemblies each* 20.

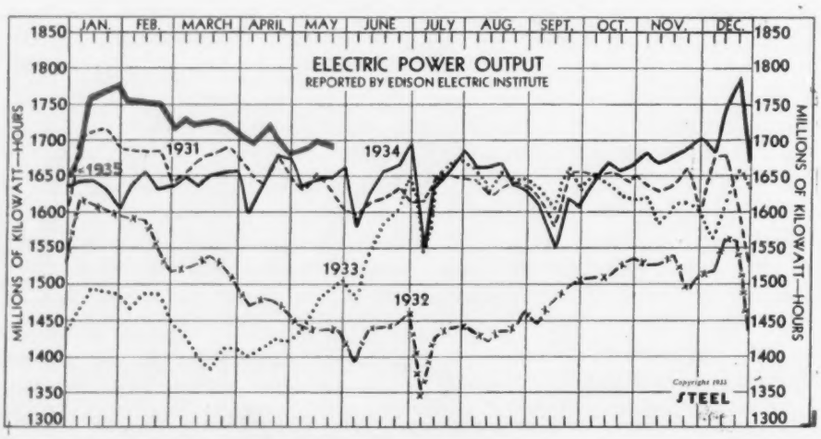
Industrial Activity Recedes Slightly in Fifth Month

IN SPITE of the fact that a number of important questions affecting the outlook of business were settled during the past month, the final week of May finds conditions almost as confusing as they were in the closing days of April.

Hope that the settlement of the Toledo strike signalized the end of labor difficulties in the automobile industry seems to have been false. Trouble has broken out in the White Motor Co. plant in Cleveland. Meanwhile the failure of Appalachian mine owners to effect an agreement with employes on new wage contracts indicates the possibility of a strike in the coal fields. The present contracts, which were extended from April 1 at the request of the government, will expire June 16. Labor difficulties in May exerted a noticeable influence upon the rates of activity in several industries, particularly automobile and iron and steel.

Fate of NIRA and the Wagner disputes will have a direct bearing upon business in the next month. Passage of the senate's proposal for extending the recovery act to April 1 probably would result in a rapid crumbling of the NIRA code structure. If the administration's desire

Million Kw.....Hr. 1935	
May 18	1,700
May 11	1,701
May 4	1,698
Apr. 27	1,673
Apr. 20	1,701
Apr. 13	1,725
Apr. 6	1,700
Mar. 30	1,712
Mar. 23	1,824
Mar. 16	1,728
Mar. 9	1,724
Mar. 2	1,734



Million Kw.....Hr. 1934	
May 19	1,649
May 12	1,643
May 5	1,632
Apr. 28	1,669
Apr. 21	1,673
Apr. 14	1,642
Apr. 7	1,616
Mar. 31	1,665
Mar. 24	1,658
Mar. 17	1,650
Mar. 10	1,647
Mar. 3	1,658

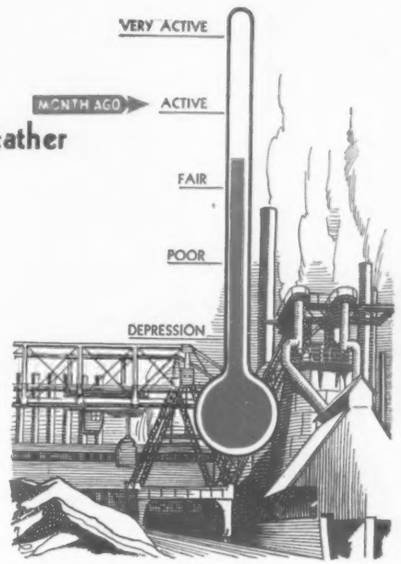
for a two-year extension can win support in the house, and if in the end this solution prevails over the senate's objections, most of the industries with strong codes will continue under the present system, but probably with altered rules.

In a measure, the trend of certain prices will depend upon which course is followed in extending NIRA. In the iron and steel industry, prices for the third-quarter have been filed just as if the present code were to continue unchanged. The new quotations generally are those posted for the second quarter. A strong advance in non-ferrous metals, particularly in lead, has taken place in the last six weeks. Other commodities which have displayed more than average strength in recent weeks are oil and textiles.

One of the favorable developments of the month is the marked improvement in demand for equipment of the "durable goods" classification. This is especially true of machine tools.

The general average of industrial activity near the end of May is down moderately from the corresponding level a month ago.

For the week ending May 18, freight traffic, electric power output, steel operations and automobile assemblies moved up slightly, causing STEEL's index to register a small gain of 1.2. However this restores only a small fraction of the loss of the previous week.



Where Business Stands

Monthly Average, 1934—100

	April, 1935	Mar., 1935	April, 1934
Steel Ingot Output	123.4	134.0	142.6
Pig Iron Output	127.2	130.4	132.1
Freight Movement	97.3	101.7	98.6
Building Construction	.....	124.9	111.8
Automobile Output	200.9	187.2	157.0
Wholesale Prices	105.5	104.1	98.6

The Barometer of Business

Industrial Indicators

	April, 1935	March, 1935	April, 1934
Pig iron output (daily average, tons)	55,710	57,120	57,873
Machine Tool Index	60.3	60.3	48.5
Finished Steel shipments (tons)	591,728	668,056	643,009
Ingot output (daily average, tons)	100,243	108,873	115,912
Dodge Bldg. awards in 37 states (sq. ft.)	.....	15,873,100	14,207,000
Automobile output	*485,000	451,805	378,983
Coal output, tons	21,920,000	38,848,000	24,977,000
Business failures; number	1,115	976	1,052
Business failures; liabilities	$18,063,923	$18,522,840	$25,736,975
Cement production, Bbls.	.....	4,299,000	6,544,000
Cotton consumption, bales	462,844	481,135	513,000
Car loadings (weekly av.)	575,776	602,922	583,708

*Estimated.

Foreign Trade

	April, 1935	March, 1935	April, 1934
Exports	.....	$185,001,000	$176,499,000
Imports	.....	$177,279,000	$141,137,000
Gold exports	.....	$540,000	$37,000
Gold imports	.....	$13,543,000	$52,279,000

Financial Indicators

	April, 1935	March, 1935	April, 1934
25 Industrial stocks	$149.73	$139.34	$144.84
25 Rail stocks	$24.01	$22.73	$39.88
40 Bonds	$80.63	$80.58	$83.94
Bank clearings (000 omitted)	$20,892,889	$22,564,491	$21,511,812
Commercial paper rate, New York (per cent)	1	1	1¼
*Commercial loans (000 omitted)	$7,830,000	$7,609,000	$4,604,000
Federal Reserve ratio, per cent	76.9	72.5	69.2
†Railroad earnings	$37,850,965	$25,719,919	$52,047,881
Stock sales, New York stock exchange	22,408,195	15,849,017	29,846,502
Bond sales, par value	$267,544,100	$311,534,900	$362,200,700

*Leading member banks Federal Reserve System.
†March, February and March, respectively.

Commodity Prices

	April, 1935	March, 1935	April, 1934	Aver. 1913
STEEL's composite average of 25 iron and steel prices	$32.29	$32.46	$34.18	$26.32
Bradstreet's index	$9.79	$9.66	$9.15	100
Wheat, cash (bushel)	$1.13	$1.10	98c	92c
Corn, cash (bushel)	$1.04	97c	61c	51c
Petroleum, crude (Bbl.)	.....	90c	98c	$2.50

Fig. 1 — Chromium-copper-silicon-phosphorus steel welded tank which did not leak after severe teratment

Modern Steels and Weight Reduction

BY J. C. WHETZEL
American Sheet & Tin Plate Co.

IN THIS iron and steel age, we have thus far been through a period in which things were made better by making them heavier. Steel gave tremendous advantages over wood and other materials of construction but often with attendant increase in weight. In recent years, lighter metals have been offered to afford the advantage of weight reduction, thus in some fields they stand as a challenge to the steel industry to utilize the best knowledge of steel metallurgy and improved design. If we are to use our iron ore, blast furnaces and steel mills to serve the present trend toward lighter and better structures, we must meet the new requirements with stronger and more suitable steels. Light-weight construction is of the greatest interest at present. Economic and other considerations require light-weight equipment for many applications.

Weight saving may be accomplished with a material of less density or with one that is stronger. It is not yet clear that a given weight of iron or steel can be expanded in the steel mill so that its density is less. It has been apparent that stronger steels with other desirable properties may be produced. Stronger steels permit the designer to save weight by reducing size and changing distribution of members, thus in effect expanding a smaller weight of a stronger steel. In doing this, new designs must be created. More forming generally is necessary in the fabricating plant. Lighter shapes must be supplied by mills or drawn from strip or sheet, the latter intimating that strip mills eventually may gain tonnage at the expense of structural mills. Connections and joints in light-weight construction become more involved with more general resort to welding. Exposed or unprotected parts must have increased corrosion resistance or the life of the lighter sections may be too short.

THE accompanying article is abridged from a paper presented May 23 at the general meeting of the American Iron and Steel institute in New York. The author, J. C. Whetzel, is assistant to vice president, American Sheet & Tin Plate Co., Pittsburgh

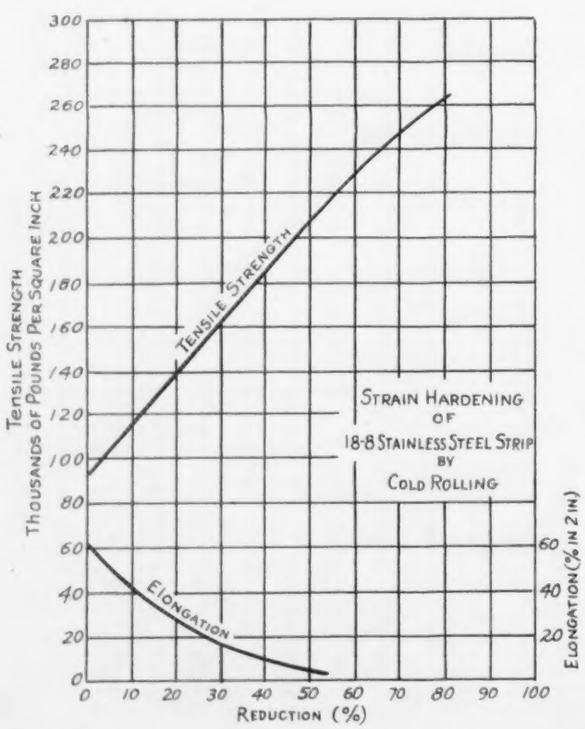


Fig. 2 — Tensile properties of cold worked high-strength 18-8 chromium-nickel stainless steel

Increased efficiency is not the only accomplishment possible with use of high-strength steels. New designs afford opportunity for introduction of new and striking features. Prominent examples are in evidence in the construction of modern passenger carrying equipment whereby streamlining, greater passenger comfort, silent operation, decreased shock resistance by use of various cushioning devices, and articulated cars and trains are developed to a satisfactory

degree. Other developments await future programs for building new equipment.

Steels have advantages of a high modulus of elasticity—28,000,000 to 30,000,000 pounds per square inch, stability at high temperatures, good strength at very low temperatures, reliability under ordinary corrosive conditions and good performance under repeated stress, which fortunately make them more generally adaptable than many of the nonferrous metals. Obviously, steels for weight reduction must have greater strength as ordinarily indicated by their tensile properties, especially a higher yield point or elastic limit, thus introducing the common term "high tensile" steels.

Table I

General Range of Elements In Low Alloy Steels

	Per cent
Carbon	0.10— 0.40
Manganese	0.20— 1.70
Phosphorus	0.01— 0.20
Sulphur	0.05 max.
Silicon	0.00— 1.00
Copper	0.01— 1.40
Nickel	0.00— 3.50
Chromium	0.00—12.00
Molybdenum	0.00— 0.40
Vanadium	0.00— 0.20

Just as important, in fact frequently more so, are impact strength, showing resistance to sudden blows, and fatigue or endurance strength, representing resistance to repeated stressing. Ductility must be sufficient for the required forming. Welding properties must be good. Atmospheric corrosion resistance and, in a few cases, resistance to other corrosive action must be high. In addition, the steel must also be available at a price which will make the completed structure a profitable and self-liquidating investment, or in some instances, will not materially increase cost of the structure.

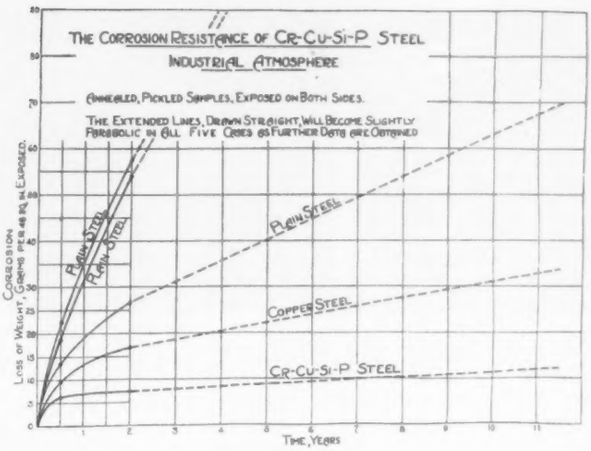

THE CORROSION RESISTANCE OF CR-CU-SI-P STEEL
INDUSTRIAL ATMOSPHERE
ANNEALED, PICKLED SAMPLES, EXPOSED ON BOTH SIDES.
THE EXTENDED LINES, DRAWN STRAIGHT, WILL BECOME SLIGHTLY PARABOLIC IN ALL FIVE CASES AS FURTHER DATA ARE OBTAINED
PLAIN STEEL
PLAIN STEEL
COPPER STEEL
CR-CU-SI-P STEEL
LOSS OF WEIGHT, GRAMS PER 48 SQ. IN EXPOSED.
CORROSION
TIME, YEARS

FIG. 3—Chromium-copper-silicon-phosphorus steel is about five times as resistant to severe industrial atmospheres as plain steel

Having indicated general requirements for a modern weight-reducing steel, we may risk some generalizations upon detailed properties and possibilities offered by the accumulated knowledge of metallurgists. There is one remarkable steel, the 18 per cent chromium-8 per cent nickel austentic stainless steel, which after cold working affords such high strength combined with ductility, that it is outstanding in its field. If this steel could be produced for a few cents a pound, the weight reduction problem would not be so complex. For the utmost in weight reduction, especially in certain rapid transit fields and in aircraft, it stands as a model of excellence. The large and important sphere of usefulness of this steel, however, is limited to some extent by its cost, but the resulting cost of a structure may prove economical when all factors are considered. Since metallurgy, engineering and economics combine to dictate a differentiation of cases, this material does not represent the solution of all problems. A case in point is the freight car. In considering steels for such equipment and for various other applications, a wide range of possibilities must be reviewed.

Before considering physical properties desired for general light-weight construction, the extraordinary properties of cold-worked 18-8 austenitic steel should be indicated. Tensile

Table II

Silico-Manganese High Strength Steels

Chemical Composition

	Medium or intermediate manganese, Per cent	Structural silicon, Per cent
Carbon	0.15—0.35	0.20—0.40
Manganese	0.90—1.70	0.40—0.80
Phosphorus	0.04 max.	0.04 max.
Sulphur	0.05 max.	0.05 max.
Silicon	0.10—0.30	0.20 min.
Copper	0.01—0.25	0.01—0.25
Molybdenum	0.00—0.40	———
Vanadium	0.00—0.20	———

Maximum Physical Properties

Yield point (p. s. i.)	55,000	45,000
Tensile strength (p.s.i.)	90,000	90,000
Elongation (% in 2 in.)	20	18
Izod, impact (ft.-lb.)	40	———
Endurance limit (p.s.i.)	40,000	———

Table III

Low-Chromium Alloy Steels for Weight Reduction

Chemical Composition

	Chromium, per cent	Chromium-copper, per cent	Chromium-copper-silicon-phosphorus, per cent	Chromium-copper-silicon-nickel, per cent	Chromium-manganese-silicon, per cent	Chromium-vanadium, per cent
Carbon	0.05—0.15	0.30 max.	0.10	0.15	0.20—0.30	0.15—0.25
Manganese	0.30—0.50	0.70—1.00	0.10—0.30	0.55—0.75	0.90—1.50	0.50—0.80
Phosphorus	0.03 max.	0.05 max.	0.10—0.20	0.05 max.	0.04 max.	0.04 max.
Sulphur	0.05 max.	0.05 max.	0.05 max.	0.05 max.	0.05 max.	0.05 max.
Silicon	0.25	0.20 max.	0.50—1.00	0.00—0.45	0.60—0.95	.....
Copper	.....	0.25—0.50	0.30—0.50	0.01—0.50	.....	.....
Nickel	.....	.....	.....	0.25—0.45	.....	.....
Chromium	5.00—12.00	0.70—1.10	0.50—1.50	0.05—0.90	0.30—0.70	0.80—1.10
Molybdenum	.....	.....	.....	Present	.....	.....
Vanadium	.....	.....	.....	.....	.....	0.10—0.20

Physical Properties

Yield point (p. s. i.)	35—100,000	46,000	50—60,000	70—80,000	60—70,000	55—80,000
Tensile strength (p. s. i.)	65—125,000	74—85,000	65—75,000	80—90,000	85—95,000	85—100,000
Elongation (% in 2 in.)	35—20	17	27—22	25—14	25—20	20—15
Izod impact (ft.-lb.)	80	.....	60	.....	32	.....
Endurance limit (p. s. i.)	.....	.....	45,000	.....	45—50,000	.....

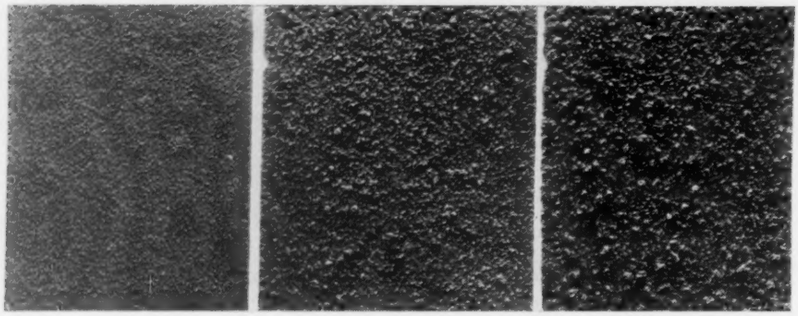


Fig. 4—Chromium-copper-silicon-phosphorus steel (left), copper steel (center), and plain steel (right), after exposure to industrial atmosphere for three years

strengths of 150,000 pounds per square inch or more may be obtained by cold working the steel and at the same time a tensile ductility may be maintained of not less than 20 per cent. It may be adjusted to any desired strength by varying the amount of cold work. Cost of fabricating very light sections in some forms of construction is frequently high, but the resulting cost of a structure may conceivably prove economical when all factors are considered. Connections are more difficult, especially if very light and fairly heavy sections must be joined. The variation in tensile properties of 18-8 strip produced by various percentages of cold reduction may be noted in Fig. 2.

Minimum Properties Specified

The economic balance for numerous weight-saving applications involving large tonnages may be met by a steel of the following minimum physical requirements:

Yield point, lbs./sq. in.	50,000
Tensile strength, lbs./sq. in.	65,000
Elongation, per cent	22
Izod impact, foot-pounds	40
Endurance limit, lbs./sq. in.	40,000

With the wide range of steels available, it is risky to generalize upon properties representing the best economic balance. It is also clear that these or any other properties will not remain the best for a long period. This is encouraging for the steel industry, suggesting that a few decades from now it will be necessary to rebuild again on the basis of better and more economical steels. The manner in which the demand for low-alloy strong steels for light-weight construction has been met may be noted in Tables I to IV.

The 18-8 chromium-nickel stainless steel is outstanding with respect to corrosion resistance. Atmospheric corrosion tests extending over a long period of years indicate that this steel, if properly treated, will not corrode appreciably for many centuries.

The lower cost applications demand a steel which will afford approximately the same life for light-weight construction as for conventional heavier construction. It appears that a steel for light-weight construction must resist atmospheric corrosion at least four times as well as plain steel. Steels having such corrosion resistance may be used with confidence that the light-weight structure will resist the elements equally as well as, if not better than, a much heavier structure built of plain steel.

In evaluating corrosion resistance of steels, it is essential that they be exposed under conditions as nearly identical as possible to those encountered in service. It is not possible to change conditions of exposure in the interest of accelerating the test without the possibility of changing the entire trend of results. It is unfortunate that this is the case as many years are required under normal atmospheric exposure to determine corrosion resistance of a steel under such conditions. The number of possible alloy steel combinations is enormous but fundamental and economic considerations furnish practical limitations.

Evidence is available in files of the American Society for Testing Materials, and elsewhere, demonstrating the increased corrosion resistance of copper-bearing iron and steel in atmosphere with an average life of two to three times that of plain mild steel. Evidence also has been presented upon the superior corrosion resistance of chromium-copper-silicon-phosphorus steels. The latter will give an atmospheric life four to six times that of good mild steel. Results of exposure of a steel of this type to an industrial atmosphere for several years are expressed graphically in Fig. 3. This evidence establishes even more resistance for this steel than for certain plain irons and steels in wide use. Typical test specimens of plain steel, copper steel and the more resistant steel are presented as Fig. 4. The oxide of the chromium-copper-silicon-phosphorus steel is dense, hard and unusually resistant. Molybdenum and nickel in some steels may also give added corrosion resistance, the former especially under strongly acid conditions.

Steel Elements and Treatments

Effects of specific elements upon properties of steel are fairly well known and it is possible to generalize upon additions which might be made to obtain desired properties. However, the combined effects of various elements are less clear, especially when several are utilized in the same steel. In the latter case there is nothing to take the place of making the steels and determining the actual properties by an extensive testing program. An element in combination with one or more other elements frequently will show properties decidedly at variance with properties exhibited by the single element.

Carbon has been the element commonly used to obtain hardness and strength. By suitable treatment of the higher carbon steels, a wide range of strength, including very high strength, is available. Manganese and silicon are other common elements in steel which alone or in combination may be used to obtain greater strength. Molybdenum and vanadium also have been added to manganese steels. In the plain carbon, manganese and silicon steels, it is difficult to obtain the ductility required in fabricating for many weight-reducing applications and in some instances impact strength is not as high as might be desired. Carbon, manganese and silicon are elements

Table IV

Copper, Nickel and Vanadium Low-Alloy Steels

Chemical Composition

	Copper nickel, per cent	Copper nickel molybdenum, per cent	Nickel, per cent	Vanadium, per cent
Carbon	0.05—0.20	0.05—0.25	0.05—0.35	0.10—0.30
Manganese	0.20—0.70	0.40—0.70	0.40—1.00	0.40—0.80
Phosphorus	.....	0.04 max.	0.05 max.	.....
Sulphur	.....	.....	0.05 max.	.....
Silicon	.....	.....	0.30	.....
Copper	0.35—1.00	0.40—1.40	2.00	.....
Nickel	0.75—2.00	0.20—0.75	2.00—3.50	.....
Chromium	.....	.....	.....	.....
Molybdenum	.....	0.10—0.15	.....	.....
Vanadium	.....	.....	.....	0.10—0.20
Physical Properties				
Yield point (p. s. i.)	40—75,000	60—70,000	50—60,000	40—50,000
Tensile strength (p. s. i.)	55—90,000	75—90,000	85—100,000	65—75,000
Elongation (% in 2 in.)	35—30	25—18	25—20	30—20
Izod, impact (ft.-lb.)	.....	.....	40—60	.....
Endurance limit (p. s. i.)	.....	.....	.....	.....

which, under most conditions, and in the proportions in question, do not tend to increase corrosion resistance.

Chromium is a most useful element in imparting strength and corrosion resistance. If used to the extent of about 12 per cent or more in the right proportion with carbon, it affords the stainless and heat-resisting series of steels. The plain chromium-carbon steels are possibilities. In absence of other elements combining to give corrosion resistance, it is necessary to use chromium to the extent of about 12 per cent, thus placing it in the stainless class and also making it an expensive steel, which may not meet the economic requirements.

Copper is useful in imparting corrosion resistance and may increase strength slightly. In combination with phosphorus, corrosion resistance is accentuated and by proper balancing of other elements the effect of phosphorus upon physical properties is altered materially. Copper in combination with chromium has been utilized abroad in high-strength high-carbon steels for some time but without claim of additional corrosion resistance. Copper and chromium in proper combination with phosphorus, silicon and other elements afford a superior corrosion resisting steel. Phosphorus in such combinations does not introduce undesirable "cold shortness." Low-alloy steels of this type have high strength, adequate ductility and good welding properties.

Nickel has commonly been added to steel for higher strength. The 3.5 per cent nickel steel was used in bridges many years ago. In combination with chromium and carbon in proper proportions, nickel gives the extremely useful austenitic 18-8 stainless steel already mentioned as having maximum strength and ductility after cold working.

Price vs. Weight-Saving

Economics of alloy additions must always be considered. Many large weight-saving applications may not prove economical if the price of the steel is too high. Vanadium, tungsten, molybdenum, cobalt, nickel, chromium and zirconium are the more expensive common alloying elements. These and many other elements are being used in the low-alloy steels. The required proportion of alloy must be considered in calculating costs.

Table I indicates the general range of elements included in modern low-alloy high-strength or high-tensile steels. In Tables II, III and IV the common high-strength steels are classified according to conventional practice, and in the case of the more recently developed steels, according to important alloy additions. Properties of all these steels may be altered materially by varying carbon content with appropriate heat treatment. Increased carbon with suitable treatment confers added strength but at the same time decreases ductility and corrosion resistance. It is necessary to establish proper balance between the desired properties and the results required in fabrication and service.

The medium manganese and structural silicon steels covered by Table II are high-strength steel used for a long time, especially in bridge construction. They are useful low cost and strong steels for weight reduction. They have excellent strength but lack the greater ductility of other low-alloy steels. They have, roughly, corrosion resistance of ordinary steel or of copper-bearing steel if this element is added. Certain copper-manganese steels were brought forth in Germany some years ago. Molyb-

Table V

Weight Reduction with High-Strength Steels

Application	Type of High-strength steel	Weight of light equipment, Pounds	Weight of conventional equipment, Pounds	Weight reduction Pounds	Weight reduction Per cent
Railroad Passenger Equipment					
Chicago, Burlington & Quincy R.R. Co.					
"Zephyr" Train	18-8 Stainless	218,000	700,000	482,000	69
Boston and Maine Railroad					
"Flying Yankee" Train	18-8 Stainless	213,600	700,000	486,400	69
Deluxe Coaches	Cr-Cu-Si-P & Medium Mn	108,800	145,000	36,200	25
Suburban Coaches	Cr-Cu-Si-P & Medium Mn	89,300	105,000	15,700	15
Suburban Coaches (body only)	Cr-Cu-Si-P & Medium Mn	60,000	74,800	14,800	20
Baltimore and Ohio R.R. Co.					
Coaches (3)	Cr-Cu-Si-P	96,000	165,000	69,000	42
Chair Cars (2)	Cr-Cu-Si-P	97,000	170,000	73,000	43
Observation Car	Cr-Cu-Si-P	90,000	183,000	93,000	67
Dining Car	Cr-Cu-Si-P	111,000	180,000	69,000	38
Mail and Baggage Car	Cr-Cu-Si-P	85,000	138,000	53,000	39
Train, Total excluding Locomotive	Cr-Cu-Si-P	768,000	1,336,000	568,000	43
N. Y., N. H. & Hartford R.R. Co.					
Deluxe Coaches	Cr-Cu-Si-P & Medium Mn	108,800	145,000	36,200	25
Norfolk Southern R.R. Co.					
Rail Motor Car Frame	Cr-Cu-Si-P	41,000	.....	.....	..
Illinois Central System*					
Streamlined Train	Cr-Cu-Si-P	436,000	1,100,000	664,000	60
Gulf, Mobile and Northern Railroad*					
Streamlined Train, 3 Cars	Cr-Cu-Si-P	301,000	700,000	399,000	57
Streamlined Train, 4 Cars	Cr-Cu-Si-P	379,000	850,000	471,000	55
*Estimated.					
Railroad Freight Equipment					
Baltimore and Ohio R.R. Co.					
Hopper Car, Class N-30	Cr-Cu-Si-P	31,200	43,000	11,800	27
Hopper Car, Class N-30A	Cu-Ni-Mo & Medium Mn	33,000	43,000	10,000	23
Hopper Car, Class N-30A	18-8 Stainless Clad & Cr-Cu-Si-P	33,100	43,000	9,900	23
Hopper Car, Class N-30A	12 Cr, Cr-Cu-Si-P & Medium Mn	32,900	43,000	10,100	23
Box Car, Class M-48	Cr-Cu-Si-P	37,500	46,500	9,000	20
Box Car, Class M-50	Cr-Cu-Si-P & Medium Mn	34,000	45,000	11,000	32
Cement Car, Class N-31	Intermediate Manganese	35,000	42,000	7,000	17
Pressed Steel Car Company					
Hopper Car	Cr-Cu-Si-P	30,000	44,000	14,000	32
Chesapeake & Ohio Railway Co.					
Hopper Car	Cr-Cu-Si-P	33,900	42,500	8,600	25
Mt. Vernon Car Mfg. Co.					
Refrigerator Car	Medium Mn	57,000	68,500	11,500	17
Box Car	Cr-Cu-Si-P	34,900	44,100	9,200	27
Rapid Transit Cars					
Electric Railway Presidents' Conference Committee					
Street Car	Cr-Cu-Si-P	31,000	42,000 to 50,000	11,000 to 19,000	26 to 38
Capitol Transit Company	Cr-Cu-Si-P	35,000	42,000 to 50,000	7,000 to 15,000	17 to 30
Brooklyn-Manhattan Transit Co.					
Articulated Elevated Car	18-8 Stainless	159,900			

denum or vanadium may be added to manganese steels to gain certain advantages as indicated also in Table II.

Selecting chromium for classifying a very important group of high-strength steels, Table III has been prepared. While chromium is important, other elements such as copper, manganese, silicon, phosphorus and nickel may be fully as important. Many combinations may be obtained for these complex low-alloy steels. Many have good ductility, considering their strength, and some, especially the chromium-copper-silicon-phosphorus steel, have excellent corrosion resistance. These special chromium alloy steels include the following combinations of elements: Chromium; chromium-copper; chromium-copper-silicon-phosphorus; chromium - copper - silicon - nickel; chromium-manganese-silicon; chromium-vanadium.

Additional high-strength steels have been developed which do not contain chormium. Copper and nickel with smaller amounts of moybdenum are the important constituents. These steels, including the plain nickel and vanadium steels, are covered by Table IV. The following combinations are indicated: Copper-nickel; copper-nickel-molybdenum; copper-molybdenum; nickel; vanadium.

Applications

Aircraft—The ultimate in weight reduction is essential for steel aircraft construction. While high-chromium steels have been applied to some extent especially abroad, the ideal material is cold-reduced high tensile strength 18-8. Advantages for aircraft are manifold and its application has been limited only by the development of designs and the steel mill facilities available for the production of required gages and widths. Structures can be built as light with this steel as with other materials and where the unit stresses are high, the advantage is materially in its favor. Its high modulus of elasticity, its remarkable corrosion resistance, its adaptability to shot or spot welding, and its high endurance limit are all important advantages.

Rapid Transit Cars—There has been a growing recognition of need for better and more efficient equipment in the rapid transit field and now new developments, based upon strong light-weight construction, are bearing fruit. One of the earliest steps in this direction involved the use of medium manganese side plates in subway cars of the New York Rapid Transit Co. An outstanding recent example is the modern street car which has been developed as the result of a far-reaching research activity carried on by the Electric Railway Presidents' Conference committee. Specifications adopted require use of a high-strength steel and, accordingly, a specimen car was constructed of a steel of this character. In addition to weight reduction, the car embodies many novel ideas, including a pleasing streamlined appearance, rapid acceleration and deceleration, passenger comfort and silent operation. Twenty cars following this general design are now being constructed for the Capitol Transit Co., Washington. Construction of several hundred additional cars of this general type is now in prospect.

The exceptional weight reduction possibilities of 18-8 make this type of material very promising in rapid transit car and train construction. Elevated lines having structures incapable of supporting heavy trains of ordinary steel are a promising field for modern light-weight construction. An example is the stainless steel train which was constructed for operation on the Brooklyn-Manhattan Transit elevated lines.

State Laws Regulate Weights

Buses, Trucks and Automotive Equipment—Passenger buses must be as light as possible not only for efficient operation but to conform with various state regulations. Light-metal alloys have found application in this form of construction. This should be an attractive field for 18-8 because of the extreme lightness requirements. Much can also be accomplished in this field with the lower alloy steels used in proper designs.

For trucks of various types, especially tank trucks and trailers, low-alloy steels are finding wide application. An example of this is the reduction in thickness of the sheets for tank trucks as follows:

	Heads, gage	Shells, gage	Weight reduction, per cent
Mild steel	10-11	12-14	.....
High-tensile steel	12-13	14-16	25-30

Thus important weight savings are possible without much additional cost.

In the automobile field, streamlining often increases weight to such an extent that advantages in lessened wind resistance are lost. The answer is evidently use of stronger steels of low-alloy type in lighter gages. Body designs must be modified to avoid extreme deep-drawing requirements which can not generally be met by higher strength steels.

Railroad Equipment—Railroad equipment manufacturers are investigating possibilities toward reduction in weight, streamlining and otherwise modernizing railway passenger equipment through the adoption of various types of high-strength steels, used singly and in combination. Under certain conditions, and as a means of effecting still greater efficiency and comfort combined with speed and safety, trains of this character are likely to supersede the familiar type of train now in use, and the construction of many such trains is assured.

Pioneering in this field was first undertaken by the Edward G. Budd Mfg. Co. through the use of 18-8. Other equipment manufacturers have adopted high-strength low-alloy steels in somewhat different designs and using different means of fabrication to produce trains of this new modern type. Luxurious light-weight passenger coaches are being constructed of low-alloy steel.

Pay Load Succeeds Dead Load

Freight cars offer greatest opportunity for weight reduction and the one economically most significant. Replacement of dead load with pay load is profitable self-liquidating. For this, relatively low cost low-alloy steels are indicated. Corrosion resistance is an important requirement if the investement is to be liquidated before rebuilding is necessary. During the last two years much progress has been made in the weight reduction of freight cars. For car rebuilding and other programs, car parts manufacturers are supplying paneled and corrugated sides and ends, floor sheets, hopper doors and roofs fabricated of high-strength steel.

Substantially all car building companies, car accessory manufacturers and railroads are trying to determine the most economical dead load weight and have contributed much to the weight reduction problem. This development should afford much tonnage to the steel industry over a period of years and is gratifying in view of the continued drop in freight and, to a less extent, passenger car construction over the last 20 or 30 years.

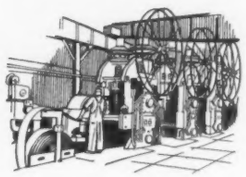
Building Construction—For factory and mill construction, a general reduction in weight of equipment such as cranes, which must be supported by the structural members, offers opportunity for savings. Dead weight in roofs, trusses and other members can be reduced with economy. Increased corrosion resistance of some of the lower-alloy high-strength steels is an attractive feature on sheathing and roofing materials.

Marine—Efforts have been made to find stronger steels suitable for marine application that will permit ship construction developments, enabling the ship owner to operate more profitably. Low-alloy high-strength steels with more general use of welding offer means of weight saving for the main strength members of the hull and similar parts. Increased fire resistance is a strong argument for the use of steel in partitions. The stronger steels permit such construction without appreciable increase in weight. Stainless steel finds application for deck houses and parts subjected to severe corrosion.

Other Applications—Many important

(*Please turn to Page* 60)

The Economic Importance of



REPLACING OBSOLETE STEEL MILL EQUIPMENT

BY D. M. PETTY
Bethlehem Steel Co.

IT IS natural that a subject which emphasizes the importance of economics in relation to replacements and obsolescence should be of interest, because no other industry has torn itself down and rebuilt itself to a greater extent than the steel industry. This is apparent when we think of the present size of iron and steel producing units and how they have grown through successive generations, from blast furnaces of 5 and 25 tons capacity to modern blast furnaces of 1000 to 1500 tons; from open-hearth furnaces with 10 tons capacity in 1886 to modern open hearths with 150 tons capacity or more. Each time there was a substantial increase in capacity, it meant, in general, a complete replacement of the unit. Many men working in our steel plants today have seen complete rebuilding of their department as often as three times in 30 to 40 years.

Conditions Affecting Profit

Economics is defined as the science which investigates conditions affecting production, distribution and consumption of wealth. In this discussion it may be defined as a study of conditions which affect the probable profit which may accrue from certain expenditures intended to improve the earning capacity of a steel mill. Such studies will usually take the form—"Shall the replacement be made?"—"Shall it be done now?"—"Shall it be done this way?"

Obsolescence may be defined as the loss in service value due to diminished earning capacity caused by advancement in the art or changes in market conditions which demand a quality of product beyond ability of the unit, or demand a quantity greater than can be produced, or less than is economical. This process may be a gradual one, the unit becoming less valuable by a small amount each year, or it may become obsolete over night. As soon as someone makes a radical change in size, or otherwise improves a producing unit, all other such units not as efficient must be considered obsolete.

A logical discussion can be laid out on the basis of what causes a replacement to be made. These causes can be grouped into four general divisions.

1. *A unit may be replaced because it is worn out.* This classification covers all types of furnaces, machinery, buildings and even foundations, because by their use their component parts become worn and they are affected by atmospheric conditions, which cause deterioration—rapid or slow, but always in some form. Repairs, of course, tend to retard this gradual wearing out, which is quite frequently called depreciation. The accounting profession has set up elaborate systems for accumulating reserves to cover depreciation so that when the unit is finally retired from service its value may be removed from the books without loss. Units which depreciate rather rapidly and which are replaced several times in one year, or even once in two or three years, are frequently covered by what is known as a rebuilding fund rather than a depreciation reserve. In these cases it often occurs that at the end of ten years, the unit, having been rebuilt many times, has been improved here and there, and so far as results are concerned may be a somewhat better unit than when originally built. In spite of this, however, there has been a certain depreciation of other parts which are not so easily improved without replacing the entire unit.

We have other units which, while not badly worn, except for some one or two parts, are finally renewed because of failure of one of these parts, making it necessary to renew not only that part, but also many other parts. Repairs to such a unit usually are made in such a manner that defects in materials or design are corrected and that a failure of the same kind is not to be expected in the future.

Replacements under this classification may be considered as caused by depreciation rather than by obsolescence, but when the time comes when repairs are needed to so many parts that a replacement should be made, all the information gathered in the operation and maintenance of the unit should be utilized so that the replacing unit is better than its predecessor.

Keeping Pace with Consumers

2. *A unit may be replaced because it is not producing a satisfactory product from a consumer point of view.* This classification may be subdivided into two parts:

(a). Where the unit does not produce as satisfactory a product as it did when originally installed. It may sometimes occur that the unit may be diverted to other lines of work and yield several additional years of service. Nevertheless, if the market is to be supplied with the product of such a unit, a new unit must be installed.

(b). Where the unit still produces as good a product as when originally installed, but where demands of the market have materially increased since the original installation, and the unit is not able to meet increased requirements, it then becomes a matter of deciding whether the new unit shall be installed to meet current market requirements or whether considerable greater refinements shall be included to satisfy not only immediate demands, but also to anticipate possible additional requirements. That action may have the effect of attracting additional customers for this particular unit, thereby increasing its saleable output. That very condition

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THE accompanying article constitutes a paper presented May 23 at the general meeting of the American Iron and Steel institute in New York. The author, D. M. Petty, is superintendent of service division, Bethlehem Steel Co., Bethlehem, Pa.

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may make it apparent that a unit of greater capacity is desirable. A careful survey must be made to determine the probable future market for these products to avoid the possibility of installing a unit and finding, shortly, that the market for its products has disappeared.

When a new unit is installed which is capable of producing a somewhat better product than is currently on the market and which users of such product can and will absorb to their advantage, the obsolescence of all the other units producing the same product whether they are in that plant or competing plants is immediately advanced.

Accelerating obsolescence in all other units may or may not be good economics, depending upon such factors as increasing the number of potential customers by virtue of a better product and by entering into an entirely new field hitherto not invaded by this particular product.

Excessive Production Costs

3. *A unit may be replaced because cost of production on this unit is high, and therefore the profits, by virtue of its operation, too low.* This may be caused by many factors which a new unit might correct, such as excessive cost of repairs because the unit is too light for its work, or where its parts are worn to a point where the replacement might properly be put in the first classification. Labor costs for operating the unit may be excessively high, which may be caused by an attempt to get out greater production than that for which the unit was designed, thereby necessitating additional men in greater proportion than the increased production. Man-hours remaining stationary, increased cost may be due to a general increase in rates paid to operators. Man-hours may be increased materially to improve the quality of the product and to make it meet demands of the trade. The economy of the unit, as related to its fuel, power or raw material consumption may be low. This low efficiency may be due to an inherently poor original design or to gradual wear and tear of all or certain parts of the equipment.

High cost of production may be caused by material increase in cost of raw materials. This increase, in turn, may be caused by exhaustion of local supply, thereby necessitating bringing materials from more distant points; or it may be caused by increase in freight rates, even to the point where raw material originally used is dropped and something else substituted, such as oil for coal, electricity for gas, etc. A change in the social laws may require extra men or unusually high expenditures for supplementary equipment. Necessary safeguards against accidents may become such an expense as to force replacement.

When making a replacement, due to high cost of production on the existing unit, there always is a tendency to install a unit of greater capacity because, generally speaking, a greater output means lower unit cost.

4. *A unit may be replaced because more capacity is desired.* The first consideration in this case is, shall additional units be added to equipment already in service, or, shall some of the existing units be removed and larger ones installed? Where quality is not adversely affected by increase in size of the unit, or where seasonal fluctuations in demand are not excessive, the larger unit almost universally will be more efficient and show lower operating costs per unit of production. Where the total number of units is limited, substituting one large unit for a number of small units might leave the department inflexible as to tonnage during dull periods, especially if several grades of a product are required to meet market conditions.

In reaching a conclusion on this point, the reduction in operating and maintenance costs of the larger unit must not be overlooked. In the past, the trend of the steel industry has been definitely toward larger units. Whether this trend will carry on to still larger units remains to be seen, but lessons of the past few years will enable managers and engineers more accurately to arrive at the correct solution of this question for their particular plant.

Two Views of Depreciation

It is evident that there is a close relationship between depreciation and obsolescence and that either one must include the other. That is, if a high depreciation rate is set, a replacing fund may be set up before the unit has become obsolete, which is another way of saying that the unit will wear out before it becomes obsolete. There has been much discussion as to how the remaining part of the original cost shall be disposed of when a unit is to be replaced because it has become obsolete. One school of thought would add this undepreciated remainder to the cost of the new unit. Another school insists that this undepreciated remainder is a loss and must be so considered and charged off at once; that it is unsound economics to charge against the new unit anything which pertains to the old. This latter policy would appear more sound than the former, because it prevents building up a capital structure not supported by real values appearing in plant and equipment.

It would appear that it is rather improbable that the correct depreciation rate can be set at the start of operations of each unit, even in a small plant. Therefore, some average figure should be set up for the entire plant to provide a depreciation reserve so that some units will be depreciated before they actually go out of service, while others will be taken out of service before they are depreciated to their scrap value, the remainder being charged to this reserve at once.

The economics of replacing obsolete equipment, that is, equipment which fails to measure up to present day standards of efficiency, is more a matter of management than of accounting, and it may prove to be better business to scrap an entire plant and replace it with a modern one, if improvements in the art have been so rapid that the decreased manufacturing cost in the new unit will earn greater profits than the old plant even with its considerably less capital charge. Capital charges in this case include interest, taxes, depreciation and/or obsolescence.

Obsolete Plant Often Profitless

From a management point of view, it may be utterly impossible to keep an obsolete plant in operation. This may be caused by such factors as: (1) Decreased selling prices, caused by competition, which may be lower than the manufacturing costs in an obsolete plant. Here it is obvious that no profit can be earned; (2) the quality of the product offered by competitors with modern plants may make it impossible to sell the product of an obsolete plant, which certainly means that no profit can be earned on the old plant; (3) the difference in manufacturing costs between the modern plant and the obsolete plant may be such as to make the new investment even better than the original investment, the selling price having remained the same. This theory may be reduced to a general mathematical formula:

Cn = unit cost of production for the new unit.

Co = unit cost of production for the old unit.

Pn = annual production capacity of new unit.

Po = annual production capacity of old unit.

K = per cent of time new unit will average in operation over its life.

D = per cent of depreciation for new unit.

O = per cent of obsolescence for new unit.

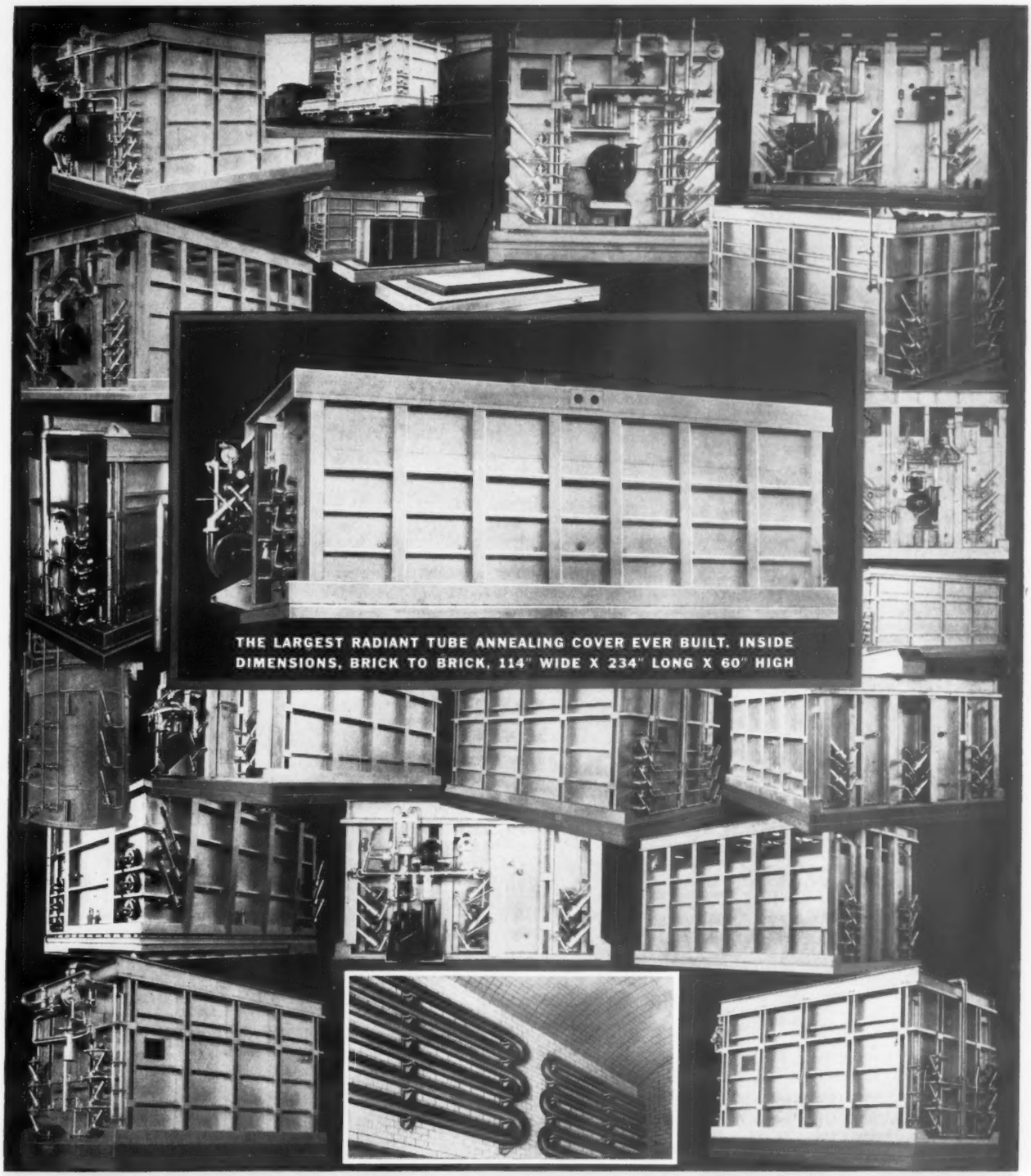
Z = total profit per unit of production on new unit.

A = total cost of new unit.

M = cost of money in annual percentage.

$$[(Co - Cn)\,Po + (Pn - Po)Z]\,K - [(\text{the greater of } AD \text{ or } AO) + AM] \div A \times 100 = \text{per cent profit.}$$

In applying this theory or formula to a steel plant, one factor must never be overlooked—it is futile to enlarge any one unit to such an extent that it is entirely out of step in producing capacity or in speed of production to those units just ahead which supply its incoming material, or in compari-



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son with succeeding departments which take its output. Continuous flow of steel through the plant must not be interrupted. Of course, this does not mean that improvements in a unit which affect costs and quality only cannot be made without a corresponding change in the preceding and succeeding units, because it is logical to improve the weakest link in the chain of production rather than rebuild the entire chain, so long as the capacity of the unit is sufficient.

Inspection of this formula reveals one obvious fact—the first part of the equation, that is, the savings per unit multiplied by the annual capacity of the old unit plus the increased annual capacity of the new unit multiplied by total profit per unit and all by the load factor, must be greater than the other factors which are to be subtracted, otherwise there can be no profit.

$$[(Co - Cn)\ Po + (Pn - Po)Z]$$

The two factors, old unit cost and new unit cost, are usually rather easy to determine and the difference between these two unit costs will be fairly constant. Increase in the cost of raw materials will affect both factors alike except that, generally speaking, a new unit usually has a better practice percentage than the older unit, which will tend to increase the difference in cost with a rise in raw material cost. In the matter of labor, as a general proposition, new processes or new machinery involve less labor per unit of production; therefore, as the cost of labor in general increases, the difference in unit cost will be greater and in favor of the new unit.

Producing capacity of the new unit is a matter of design and must be determined in advance by a careful study of the market trend. Ordinarily, unless the market trend is upward and a greater volume of business is expected, a new unit should not be considered, and certainly will not be considered if the market trend is downward.

The Factor K

The most uncertain quantity in the formula is the load factor *K*. This represents the average percentage of time the new unit will operate at full load each year during its life. Management must examine the market trend to determine both what the past experience has been, and something about the future, not only with reference to the present outlets but also as to the possible additional outlets for the product, such as how much wider will be the distribution of the particular product if its selling price can be reduced or its quality improved. A condition which may materially affect this factor is change in buying habits of the public or a change in style of the product. If the product is a staple commodity, such as pig iron, the probability of great change in demands of the buying public is considerably less than if the product is one which is subject to frequent style changes. In some cases, the product may be only an adjunct to the principal commodity, so far as the ultimate sale is concerned.

Seasonal demands sometimes can be met by operating manufacturing processes at a more or less continuous rate throughout the year and storing surplus production during slack sales months to meet the rush demand at other seasons of the year. Whether it is better policy to operate at a steady annual rate and store against the rush season or to install equipment sufficient to meet rush season demands and shut down this particular unit during the dull season, is one which can be answered only after a detailed study of the product. A factor which must not be overlooked, however, is that labor should be given as regular employment as possible.

Trend Is Upward

The general trend of consumption of iron and steel products has been upward for many years. The consumption of a particular steel product always will show a rapid rise shortly after its introduction, followed by a period of leveling off and occasionally followed by a period of declining consumption. The long-term load factor *K* of a finishing unit always will be lower than that of primary departments such as the blast furnace and open hearth or than the service departments which include transportation, electric power, steam and water. As demand for one finished product decreases, another may increase to such an extent that demand on the open hearth for steel ingots may be the same, and demand on service departments even greater because of the more highly finished nature of the product.

For instance, energy required for rolling and finishing one ton of a light product like thin sheets is much more than that required for such products as heavy structural shapes.

Factors AD and AO

The second and third, or subtractive parts of the equation, also must be carefully studied. The item *A*, which not only enters into the subtractive portion but is also the divisor when determining the percentage of annual profit, varies from time to time. During a period of high construction costs, certain improvements will not be profitable, but with a material decrease in the cost of various items which enter into a construction program, the same improvement might become profitable.

The item *AD*, which is depreciation, may be calculated from the probable life of the machine or equipment in question, and, in general, the depreciation factor should be sufficient to set up a depreciation allowance equal to the cost of the unit less its scrap value at the time it becomes so worn that it is no longer efficient. This is a proper charge to include in operating cost, because it is merely a process of transferring a portion of the original cost of the equipment into its product which is sold. A careful engineering survey of the unit ordinarily will reveal a figure which will be proper to cover this wearing out process. If conditions change, it may be necessary to either increase or decrease this figure to provide the proper depreciation reserve. Sufficient funds then will have been provided to prevent a loss when the unit has been worn out and must be retired.

Earning Capacity Counts

The factor *AO* is not subject to the same mathematical calculations as *AD* because obsolescence is not a matter of wearing out, but rather a matter of earning capacity. This may be affected by the demand for the product of a unit decreasing because its cost is so great it cannot be sold or because the public no longer desires such a product, or for many other reasons, none of which, however, may be connected with the wearing out of the unit. Generally speaking, in the earliest stages of development of any new process, obsolescence on equipment will be high because the operator of the equipment will invent improvements which will tend to lower cost or improve quality of the product to such an extent that the original equipment is no longer commercially usable. Therefore, in general, changes in equipment, where the processes are relatively new, should be delayed as long as possible to take advantage of the latest improvements, of course, never delaying such a change to the point where the losses are too great or where lack of quality in the product might result in loss of its market. Generally, it is also true that during early stages of development of a process market demands are growing so that additional equipment of more modern design frequently can be added without scrapping the original equipment.

It should be noted that these two factors *AD* and *AO* are not to be added, but set up independent of each other; for example, depreciation should be set to provide against wear and tear only and obsolescence should be set to provide against loss of service value. The latter is a matter of judgment and if it is the larger, the former does not count since the unit will be replaced before it wears out, assuming that judgment of the management was correct in setting the obsolescence rate.

The Factor AM

The remaining subtractive item in the equation, *AM*, the cost of capital with which to make improvements, is one which must be surveyed carefully and it may frequently happen that an improvement cannot be justified at

one time due to the high cost of money and may be entirely feasible at some later time when the cost of money has decreased.

If there is a large cash surplus on hand, on which a very small return can be earned in the money markets, certain improvements may be made with much more certainty than if funds are scarce and must be borrowed. In general there are few avenues of investment for surplus funds better than in needed improvements that stand the test of "Shall it be done?" "Shall it be done this way?" and "Should it be done now?"

In surveying this general problem, there are several rather obvious conclusions:

1. Improvements in service departments can be made on a lower net return than in manufacturing departments, because in general their load factor is higher and their obsolescence factor lower.

2. Since primary departments—blast furnace, open hearth, bessemer and electric furnace—have a higher load factor than finishing departments, improvements here can be made with better assurance that they will be used than is the case with finishing departments.

3. It becomes necessary to make improvements in certain finishing departments when they cannot meet competition of other producers or when they cannot meet the demands for quality from customers, whether the return on the investment is all that is desired or not. For this reason, investments in finishing departments will always be a greater risk than in the primary and service departments.

Postponing Obsolescence

Obsolescence to some extent can be postponed by improving component parts of equipment. For instance, cylinders and pistons may be replaced with new ones of improved designs or valve gear may be changed on existing gas or steam engines, materially improving operation.

Supplementary roll stands may be added to existing mills or a steam engine may be replaced by electric motors as the main drive, control apparatus can frequently be applied to existing electric motors to improve performance or increase the speed of the mill to increase production or improve quality by reducing the temperature drop between entering and finishing passes.

Equipment for controlling the rate of cooling of the finished product may be added to existing hot-beds to improve quality of the finished product. Welding has made possible changes to, as well as facilitating maintenance of, equipment which were formerly virtually impossible.

In the foregoing discussion, processes and equipment have been considered without regard to patents, but in many cases the patent situation cannot be ignored. For instance, selling price of a product covered by a patent may be maintained at a relatively high figure. At expiration of the patent, the selling price may possibly be materially reduced, and this reduction may expand the market it such an extent as to make this an even more attractive field. On the other hand, it may take away business from a competing product to such an extent that its production is no longer profitable and equipment for its production obsolete.

It is true that if a process or a piece of equipment is covered by a fundamental patent, obsolescence can be held within certain limits during life of the patent and additional protection against obsolescence frequently can be obtained by application of improvement patents. However, it is dangerous economics to depend entirely upon patent protection for holding a market for any given commodity because the greater the potential profit in such a product, the greater will be the effort put forth by potential competitors to devise ways and means of avoiding patents which cover it, and, the greater the competition will be at expiration of the patents.

Application of new ideas in some cases may involve a complete replacement of certain equipment or process, in others only a modification. The only purpose of this part of the discussion will be to suggest possibilities, rather than to prove the case for any particular idea; such proof would have to be predicated on many local factors such as cost of coal delivered to the plant, what part of that cost was transportation, labor, losses, etc. This would set the value of a B.t.u. The market for by-products also would have to be known. The available labor would have to be studied; can it be trained to handle complex operations efficiently, or must such things be avoided?

Service Departments

In the transportation division a new tool is rapidly proving itself, the oil engine as applied to a locomotive. Such a locomotive has many advantages over the present-day steam locomotive for yard shifting as evidenced by the large number put into service last year as compared with the steam locomotive.

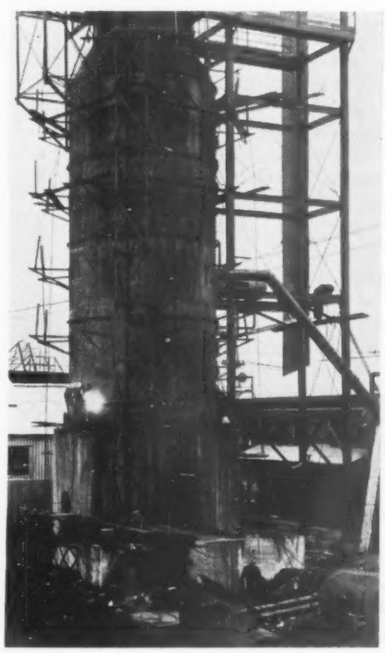
Use of roller bearings is rapidly proving its case against conventional bearings, especially for cars which must carry heavy loads and where break-away friction is an important item, or in places where heat thins out grease or oil in the conventional bearing, or where excessive dirt necessitates frequent renewals of brasses. This is a typical case of where the improvement can be added to existing units.

In the steam department, the modern steam generator is finding favor, not only because it is an efficient unit, but also because it adapts itself nicely to the job of burning the last remainder of by-product gas, supplemented automatically by powdered coal or oil.

The waste heat boiler as applied to gas engines, both for electric power generation and for blowing blast furnaces, long has been in use abroad and now has proved its case in this country, improving the thermal efficiency of the gas engine 30 per cent and being practically automatic in operation. Except where value of fuel is low and where the load factor is less than 50 per cent, the return on the investment in these units will vary from 50 to more than 100 per cent per year.

Closely allied to the steam department is power generation, not only because of the use of steam turbines, but also because the waste heat boiler makes it possible to generate power

Grows in Service



ARC WELDED 55-FOOT BUBBLE TOWER, under construction at Maurer, N. J., for the Barber Asphalt Co., when in service at 650 degrees Fahr. grows 2¾ inches taller. The equipment is part of a vacuum distillation unit designed and installed by the Lummus Co. for production of asphalt. The tower is 15 feet in diameter, of arc welded construction and erected by the Chicago Bridge & Iron Works. Shell is of steel plates ranging from ⅞-inch thick at the bottom to ¾-inch at the top. Butt joints are used in the shell, field welded with 5/32-inch electrodes. Welding equipment was supplied by Lincoln Electric Co., Cleveland

on gas engines somewhat cheaper than ever before, not forgetting that the design of gas engines has been materially improved by better ignition, more scientific lubrication, use of special valve rigging to insure the exhaustion of all the burned gases from the cylinders and supplying a full charge of fresh air to furnish the necessary oxygen for complete combustion.

It would now appear that an ideal electric generating station for a steel plant is a battery of gas engines of either 4000 or 8000-kilowatt capacity each, depending on the aggregate size of the station, equipped with waste heat boilers supplemented by some steam turbine capacity, to use the steam not only from the engine boilers, but also from the boiler plant which uses the last remainder of by-product gas.

The electrical department is finding it advantageous to replace many old and high cost motors with motors of modern design equipped with anti-friction bearings, their windings enclosed in a dust-tight cover, but sometimes ventilated by a fan. Also modern automatic control for motors can give producing operators what they need in speed to reduce cost.

Primary Departments

One of the principal improvements to coke plants of the future will be simplification of design to reduce first cost. This new design will also include better heat insulation and generally improved refractories. Dry quenching of coke has definite possibilities where the value of a B.t.u. is great or water is at a considerable premium.

The trend in blast furnaces is toward larger units. The most attractive field for improvement of existing furnaces lies in production and use of the gas. This may be accomplished by better stoves, the improvement taking the form of higher blast temperatures and lower fuel ratio or a reduction in the gas burned in the stoves with a greater amount left for other purposes. The more efficient stoves require good gas cleaning and the modern electrical precipitation gas cleaners offer a saving in cost over the present-day mechanical cleaners sufficient to yield a net return on the investment in the order of 30 to 50 per cent and even up to 100 per cent where the cost of power and water is very high.

The modern gas-engine driven blowing engine, delivering blast at 18 pounds pressure, requires only 13.47 B.t.u. per cubic foot of free air in the form of blast furnace gas and will also yield 0.003 pound of steam from its accompanying waste heat boiler. With the value of gas at 13 cents per million B.t.u., the net blowing cost of such a unit will be in the order of 25 to 30 cents per gross ton of pig iron in a 600-ton furnace, and less in a larger furnace.

Open-Hearth Department

Recent improvements in open-hearth furnace design have been largely for the purpose of reducing fuel required per ton of steel. Processes in the open-hearth furnace, of course, have been materially improved also, but these processes, generally speaking, can be applied to an old furnace almost as well as to a new one, provided the old furnace is capable of producing temperatures in the bath sufficient to cause the desired reactions. Improvements in the thermal design of the furnace, therefore, may be used either for the purpose of reducing the B.t.u.'s required per ton of steel, or to increase temperature in the bath to improve the quality of steel.

Many of these improvements, in general, can be and have been applied to furnaces at the time of their normal rebuilding, except where space limitations do not permit sufficiently large regenerative chambers to be constructed. Under these conditions, and especially when new furnaces are being designed, it would appear that a portion of the regenerative chambers built entirely separate from the furnaces, as in the case of a blast furnace stove, might offer advantages. The smaller furnaces in large open-hearth departments have become obsolete because the larger furnaces, in the order of 150 tons capacity, have shown considerably better operating costs.

Automatic control of fuel applied to the furnace, by pyrometers suitably located in the roof, have permitted the roof to be insulated with a material increase in roof life, as well as a reduction of both fuel consumption and time required for making a heat. Improvements may be applied to a limited number of furnaces which can be operated at a high load factor, so that a greater yield on the improvement cost can be realized than if all were improved.

Impurities in Ingots

Present-day processes of making steel are rather contradictory inasmuch as the metal is refined in the open-hearth, or even the electric furnace, until it is in as nearly a perfect condition as possible. It is then tapped into a ladle and teemed into ingot molds where it is allowed to cool to solidification. Whatever impurities remain in the steel, together with certain alloys purposely added, separate from the steel and concentrate in the center and near the top of the ingot, making it necessary to discard quite a percentage of the ingot to eliminate this undesirable part. It is a problem worthy of our best minds to devise a process whereby this segregation will not take place and we can take the ingot, or whatever its new name might be, and finish it complete for shipment to the customer.

Roughing or blooming mills usually supply blooms or bars of some form to a number of finishing mills and consequently work at a better load factor. Since there is usually a limited number in any plant, they must be reliable units, as the entire output of the open-hearth department must flow through these first mills. Improvements have been largely along the line of making these units more reliable or increasing capacity. Application of the electric motor has improved control over the mill, making it possible to roll slow or fast. Also, where desired, automatic screw-down control can be arranged so that the draft per pass can be limited and a definite number of passes set up so as to insure each ingot being rolled similarly.

Better Finishes Demanded

The general trend of demands of steel consumers is for products that are more and more highly finished. Structural steel seems to be drifting toward sections of lighter weight but greater strength, and the finishing tolerances are becoming more and more restricted. This means closer rolling tolerances, and improvements in mills and mill operations must have this in view. Accurate temperature control will be necessary not only in the heating furnaces but also as the piece moves through the mill. Speed of mills must be constant, so that each piece will finish in about the same time from the furnace.

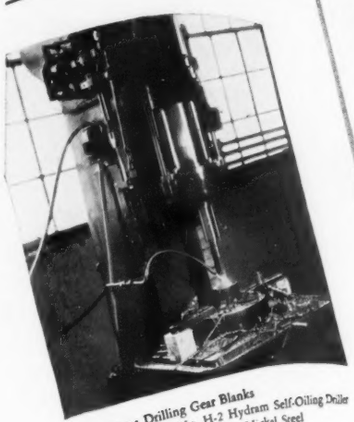
Steel must be rolled to very accurate sizes, which requires finishing stands of great rigidity and finishing temperatures accurately controlled. Heat treatment of steels to meet requirements of the trade is calling for better furnaces and much more accurate control of temperature than ever before, as well as control of furnace atmosphere.

The steel industry takes its raw materials from the earth at places where nature left them, assembles them at the mill, and, after several major metallurgical and mechanical operations, ships a rather highly finished product to its customers. These operations require a tremendous investment in mines, land, buildings and equipment at a rate of about $65 per ton of ingot producing capacity.

With 90 per cent activity, it requires well over two years for the sales value of products to equal invested capital. This means that in times of maximum volume, a 10 per cent profit included in the sales value represents a return of somewhat less than 5 per cent on the investment. No profit can be made at low volume

(*Please turn to Page* 68)

For Fast, Clean DRILLING



Operation: Drilling Gear Blanks
Machine: Barnes No. H-2 Hydram Self-Oiling Driller
Material: SAE 3140 Chrome Nickel Steel
Size of Drill: 2½ inches
Lubricant: 1 part Sunoco to 20 parts water

Courtesy of
Barnes Drill Company
Rockford, Ill.

Operation: Resharpen cutting lips of 1 in. diameter twist drills.
Machine: Sellers No. 2B Drill Grinder
Material: High Speed Steel.
Stock Removed: ⅛ inch off each lip.
Wheel: 8 in. x 2¼ in. x 1¼ in. face. Special shape.
Coolant: 1 part Sunoco to 40 parts water.

Courtesy of
William Sellers & Co., Inc.
Philadelphia, Pa.

WHEN Sunoco Emulsifying Cutting Oil — with its superior cooling and lubricating qualities — is relied on in the drilling operations, shop records testify to the excellent and accurate work achieved. That's why Sunoco is chosen so widely and consistently . . . Its users are legion!

Sunoco Helps Drill More Holes Per Grind

Because drills can cut so fast and clean with Sunoco "on the job," definite results are seen in the greater number of holes drilled for each tool grind. Further, these holes are of *accurate* size, and truly cylindrical. Rough holes are eliminated and breaking down of outer corners of the cutting edges is reduced to a minimum.

Drill Life is Lengthened

Observations of drilling operations in many shops over long periods of time indicate unmistakably other advantages which follow the use of Sunoco. Drills clean easily; chips don't freeze on the drill; there's no clogging; no burning. Longer drill life is noted — and power costs are lowered. These are not generalizations; they are actual results widely achieved by Sunoco.

● Manufacturers who have taken advantage of our cutting oil engineering service have found such cooperation and consultation worth while. To solve your drilling or other metal working problems, we invite you to ask for the help of our skilled engineers. That will involve not the slightest obligation on your part!

. . . Use SUNOCO EMULSIFYING CUTTING OIL

SUN OIL COMPANY, Philadelphia, Pa.

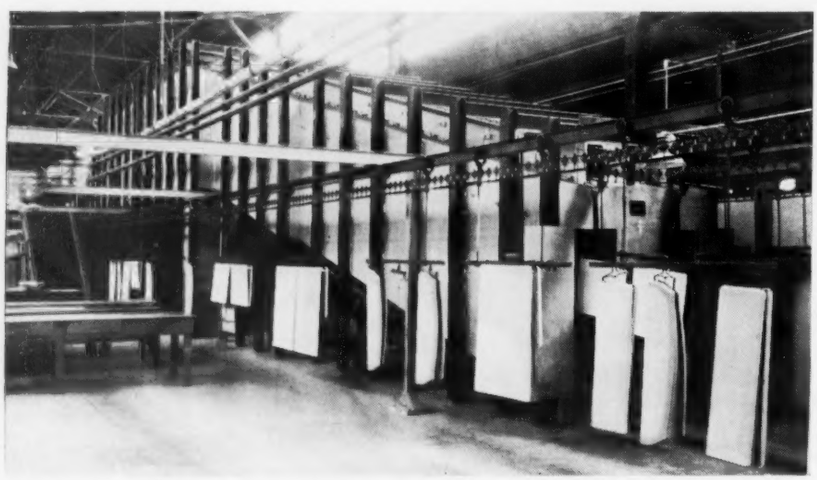
Subsidiary Companies: Sun Oil Co., Ltd., Montreal and Toronto; British Sun Oil Co., Ltd., London, Eng.

METHODS AND MATERIALS

Copper in Brake Drums To Improve Heat Dissipation

Dissipation of heat during the braking action on the modern high-powered automobiles is quite a problem, and to some extent has been overcome by using large surface area drums, ribbing the exteriors, etc. However, one of the newest ideas is application of a metal with high thermal conductivity to the exterior drum surface. On one type of patented drum, this is accomplished through the process of centrifugal casting and an alloy iron containing not less than 3 nor more than 15 per cent copper. The drums are cast in dry sand molds on a vertical spindle machine rotating at 5000 surface feet per minute at a temperature ranging from 2300 to 3000 degrees Fahr. Action of the centrifugal force throws most of the copper to the outside so that the drum has a copper rim, and it is said that there is no sharp line of demarcation between the copper rim and the alloy iron interior.

Enameling Furnace a Constant Performer



ELECTRIC ENAMELING FURNACE HAS NICE PRODUCTION RECORD; Although in operation for more than 5 years, a continuous enameling furnace in the plant of the Enamel Products Co., Cleveland, maker of porcelain enameled table tops, breakfast room sets, stove fronts, and various building materials, has not been the cause of a production holdup. Moreover, carefully maintained records show that the yearly cost of repairs on the furnace, including labor, materials and overhead, have amounted to less than 0.2 per cent of the original installation cost. The equipment is a 600-kilowatt, 230-volt, 3-phase furnace built by the General Electric Co., Schenectady, N. Y. It is 95 feet long and consists of a preheating chamber and an elevated, heat-sealed firing chamber. It was laid out for a production of 2400 square feet of work an hour, but during many of the peak runs has turned out as much as 4500 square feet of product per hour. According to R. H. Schwendler, plant superintendent, the furnace has enameled an average of 4000 square feet per hour since installation, and this he estimates as being equivalent to 6000 pounds per hour during a production day of 20 hours

\$ \$ \$

New Nails for Galvanized Sheet Steel Roofs

In order that galvanized sheet steel roofing may be attached without the formation of holes that will admit moisture, the Deniston Co., 4856 South Western avenue, Chicago, has developed a new nail whose head is set in lead. When the nail is driven, the lead automatically shapes itself, tightly covering the hole around the nail and completely covering the break in the galvanized surface. The company also makes this nail with a screw shank which turns as it is driven into the wood. Known as "Lead Seal," the new nails also may be made of pure copper.

\$ \$ \$

Hydraulic Cylinder Liners Are of Alloy Cast Iron

Cast iron for hydraulic cylinders on a grinding machine for finishing cylinder bores on internal combustion engines are being made of the following analysis by the Manufacturers Foundry Co., Waterbury, Conn.: Total carbon, 3.20; silicon, 1.30; manganese, 0.80; nickel, 1.50, and chromium, 0.60 per cent. Steel to the extent of 40 per cent is used in the charge The castings develop a brinell hardness of 200 and a tensile strength of about 40,000 pounds per square inch

\$ \$ \$

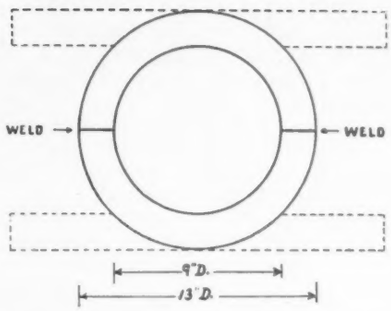
Makes Large Steel Washers By Welding Semicircles

In stamping steel washers with 13-inch outside and 9-inch inside diameter, a manufacturer recently com-

puted that of the 170 square inches in the original sheet, about 100 square inches went to waste.

This method has been replaced by one involving the use of 2-inch flat bars of the right thickness and cut to right length. The flats are bent into semicircles which are welded together with a ⅛-inch overlap. The new process was worked out by the Thomson-Gibb Electric Welding Co., Lynn, Mass., and a No. 2 welding press manufactured by that company is doing the work. It is equipped with dual welding dies by which both welds are made simultaneously, using a special fixture so that the parts can be positioned and held quickly and securely. The welds are reduced to metal thickness, making the finished product almost identical with that formerly made by stamping. It is powered with a 200-kilovolt ampere transformer to provide the required capacity.

In this set-up an operator working with a helper turns out more than 1000 pieces per hour. The press is sufficiently flexible in design so that by removing the special fixture for the washer operation and replacing it with another, it can be adapted to many different operations.



Large washers are made in one plant by welding flat steel bars which are bent into the semicircular shape. Both welds are made simultaneously

750-Ton Hydraulic Presses Form Sheets For Solid Steel Auto Tops

TWO, high-speed, triple-action 750-ton hydraulic presses, built by Baldwin-Southwark Corp., Philadelphia, have been installed by Fisher Body, Cleveland division, General Motors Corp. One press is engaged on the first drawing operation in the line devoted to production of turret tops for Chevrolet cars. The other, in the same line, does the flanging around the rear window, windshield and sides of the top.

The presses have hydraulically-operated toggles for the development of loads necessary to the formation of body parts. They are part of a line which is turning out as many as 1200 finished tops in 6½ hours working time.

In these new presses the actual draw stroke is comparatively slow, reducing to a minimum the tendency toward rupture or wrinkling of the metal. Both the idle portion of the down stroke and also the return stroke are made at high speed, so that the entire double-action cycle may be performed in 6 seconds. Allowing for time required in loading and unloading the press, production in the first drawing operation averages about 6 tops per minute or at the rate of 360 per hour. It is obvious other parts of the line function to limit the daily production to the figures indicated above.

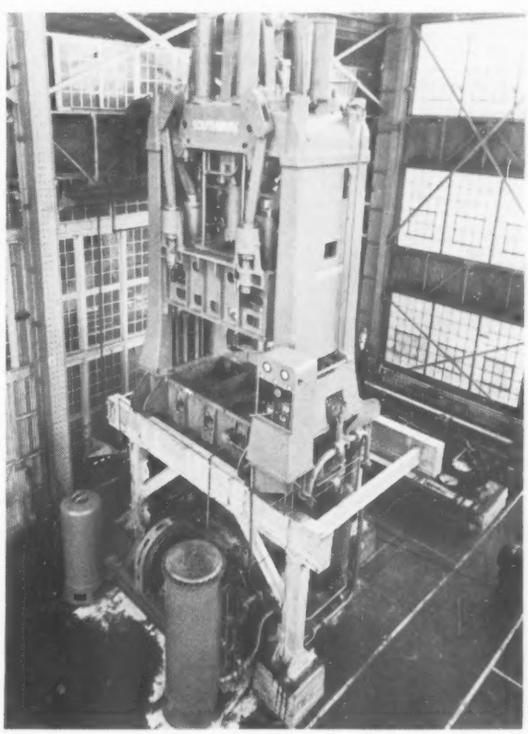
Each press is powered by a motor-driven pump of 285 gallons per minute capacity and operates with oil of approximately 920-second Saybolt viscosity at 100 degrees Fahr. This oil actuates two hydraulic pistons, one for the inner slide and one for the outer slide or blank holder. These pistons are of such size as to supply the proper load values to the various operations through the mechanical advantage of the toggle levers. By applying pressure on one side of the piston the moving parts are brought down to perform the work, after which the oil is admitted to the pull-back side of the piston, returning the moving parts to the top position. To reduce power consumption, pneumatic cylinders provide balancing forces for the weights of the moving parts.

Stand Four Stories High

These presses have a clear distance of 132½ inches between guides and a table width of 96 inches. The maximum blank holder "daylight" is 98 inches, while the maximum "daylight" between table and inner slide is 119 inches. Inner slide stroke is 37 inches and blank holder stroke is 26 inches. The approximate weight including all accessories is 500,000 pounds. They stand 26 feet 8 inches above the floor and extend nearly 10 feet below the floor level—making in all a structure nearly four stories in height.

The 8-inch diameter columns, of which there are four, are preloaded to a value well above any anticipated load so the heavily keyed joints between the various parts of the press never will be allowed to open or "breathe" in service. In this way permanent rigidity and alignment are assured.

These presses have triple action in that there are three independently-acting devices—the blank holder, the inner slide and the die cushion equipment. The inner slide is the part usually used for the major part



THIS shows the full height — over 36 feet—of one of the presses as it was set up for testing in the builder's plant

of the forming operation. It has a motor-driven adjustment of 12 inches in addition to its 37-inch stroke.

The blank holder restrains the lateral motions of the blank as the drawing operation, by the inner slide, progresses. This restraint must be definite but not too great since, if too great, the blank will tear. The simple and rapid adjustment of this blank holder load is one of the features of this type of hydraulically-powered toggle press and is used continually as quality and thickness of blanks vary in a given lot of steel. Any delay in the first press in the line delays the whole line with consequent increase in cost of product.

Actions Are Independent

The die-cushion equipment functions to hold the blank locally—as a restraining mechanism—or to punch out an opening in the blank, or for other purposes. This feature may be used or not at the option of the operator; it is entirely independent of all other services of the machine. There are three units of this equipment and one, two or three of them may be used as needed. One or two may be used as punches while two or one is used as a cushion. The cushion load is adjustable at all times from the operator's control board.

The control of this press is such that all actions may be interconnected and the operation, once started, will continue, under normal conditions, to the finish of the part. The operator can at any time, however, stop and reverse the various motions of the parts, returning them to initial position. The blank holder and inner slide are flexibly interconnected so that a part of the stroke of one or the other is performed by the other or the one, effecting a worthwhile saving in high pressure fluid and, therefore, in power.

The design is such that the probability of damage to the press due to maladjustment of the dies or the accidental introduction of more than one blank is much reduced, over mechanically powered toggle presses, since the power of the toggle levers is definitely limited by the capacity of the hydraulic cylinder. The toggles never are allowed to reach "center" fully; as a consequence the load is limited to a designed value. In addition these presses can never be locked on "center."

An actual case in point involved the accidental introduction of a heavy cast iron washer into the die. A turret top was formed—only to be scrapped, of course—but there was no damage to the machine and only local damage to the die which was welded, ground and polished and the press soon in production again.

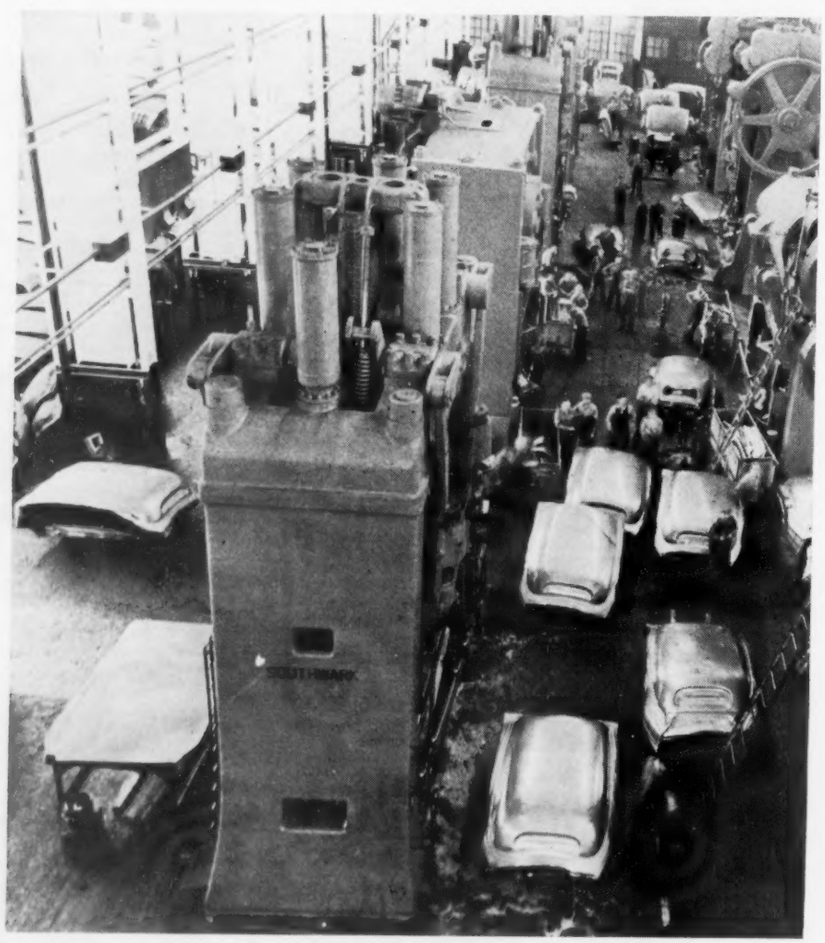
Accessibility for handling materials and dies to and from the press is provided in that there are no obstructions on either side. The inner slide can be lowered below the blank holder to any convenient position, thus facilitating adjustments of the dies.

In addition, the control is so flexible and convenient that in die setting the slide may be placed within 1/64-inch of a desired position.

Die Comprises Three Parts

In the case of turret tops the drawing die is in three parts. The lower die has the actual shape of the turret top and is in one piece. The blank holder is that portion of the die which holds the blank in proper position while the core, supported on the inner slide, does the actual drawing. All forming is done cold. The oxyacetylene flame is used to stress relieve strains set up in certain portions of the top by the drawing operation.

With the exception of the toggles, these new presses are similar to three presses of this type built last year by Baldwin-Southwark and installed at the plant of A. O. Smith Corp., Milwaukee. The latter include one 2300-ton double-action, one 2300-ton single-action, and one 1200-ton single-action, all straight hydraulic units without toggles. They are used for production forming of side bars for automobile chassis frames and front bars for knee action members. Baldwin-Southwark is now building two more of these straight hydraulic, 1200-ton single-action presses, for use by Ford Motor Co. in the production of side bars for chassis frames.



Production line in body shop where a "turret top" is molded to shape every 10 seconds

Standards Bureau Prepares Monograph on Pure Iron

The Engineering foundation, through its alloys of iron committee, has undertaken the preparation of a series of monographs—several already being in print—which collectively will constitute a complete and critical review of available information in regard to iron and its alloys.

As a contribution of the national bureau of standards, Washington, to this program, members of the staff

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patented, serves as catcher and feeder for the 2-high and 3-high sheet and tin mills. Handles material horizontally, thus keeping it always flat. Assures increased production at low operating cost and low maintenance.

OUR HOLDING TABLE

a patented delay mechanism for cooling stock between roughing and finishing stands of strip mills, prevents curtailment of production.

OUR ROLLER LEVELER

with backed-up rollers for hot and cold material, handling material up to 80" width.

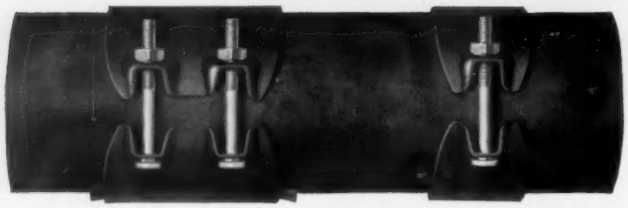
OUR ROLLER-TYPE HOT BED

another feature of our special machinery for rolling mills, automatically operated, constitutes the most advanced and economical Hot-Bed System in regard to first cost, operating cost, and maintenance; uniformity of structure, and straightness of rolled stock.

OUR MOTOR-ROLLERS

eliminate mill table delays. They are entirely self-contained units, having a stationary shaft and a minimum number of wearing parts.

SCHLOEMANN ENGINEERING COMPANY
EMPIRE BUILDING **PITTSBURGH,** PENNSYLVANIA.
HYDRAULIC AND ROLLING MILL MACHINERY!



Pipe clamps formed of 3/16-inch steel plate

have collaborated on a review of available information on the preparation and properties of high-purity iron. This review, entitled "The Metal—Iron," under the authorship of H. E. Cleaves and J. G. Thompson, will be published by the alloys of iron commitee in about two months.

Pressed Steel Pipe Clamps Made of 3/16-Inch Plate

An interesting use of 3/16-inch steel plate, evolved by the M. B. Skinner Co., South Bend, Ind., is in the manufacture of pressed steel pipe clamps, shown in the accompanying illustration. The company found that among gas, oil and other large industrial companies there was a demand for a pipe repair clamp for stopping leaks in pipe lines, and one that would sell at a low price in view of the fact that it had to compete with home-made blacksmith jobs.

In designing the clamp, the company also had in mind the growth in the use of welding patches. As finally developed, the clamp may be used to make an instantaneous, permanent repair, or it may be applied as a temporary repair and one-half of the clamp later used as a welding patch. The clamps are hot formed in a 50-ton press, careful die work being necessary to form the bolt lugs on the clamps.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

To Business Men

USE your own mature and experienced engineers to control the application of welding to your job. If you propose to get your information about welding from salesmen who sell the equipment and supplies, see that it goes through the discriminating mind of an engineer who knows your business. Or if your own engineers are too much occupied with other duties to be expert in welding and you employ a professional coach to keep them up to date, keep your experienced man in control. This is the safe way to profitable results.

No one man is good enough to know all about your business and also know enough about welding to proceed safely. Your most valuable assets are in your able engineers who have a background of experience in your business. Teach them welding, metallurgy, metal forming, electronics or anything else applicable to your business. Hunt up the best men in the country you can find to give them the information and viewpoint they need; but keep the authority and responsibility with the men who know your business.

This thing of having a hundred different experts in a hundred different fields, all going different directions, is ridiculous. Go out and hire your experts for a day or two at a time and lock them up with your own old hard shells. The net result will be: Better morale among your men; they will not overlook any good bets in the field of new knowledg; you will not be let in for so many "smart schemes" that cost you a lot of money.

Work and Happiness

The weak and tender minded complain that manufacturing industry replaces men with machines and turns the men out to starve. Yet, as the General Motors Corp. decreases the labor required to build an automobile, it creates need for more labor than was replaced in making refrigeration apparatus and other manufactured products people want and will buy. The General Electric Co. is relentless in its pursuit of greater productivity per man-hour, but for every man replaced, it creates a job for two or three men in domestic heating equipment, radio, home appliances. And so on throughout all technical fields where development and research lead the way.

In the not too distant future the man on the street will have to make his choice between the kind of jobs the politicians at Washington create and the kind of jobs private industry, lead by research and development, has been creating for many years. It does not seem possible that both solutions can be carried out simultaneously for more than a year or so.

The time has come to squelch most of the political humbug and get back on the job of producing the things people want at a price they can afford to pay. That means work and happiness for everyone.

Sparks and Flashes

Three years ago a company organized for profit started a research program on welding. A year ago they made the results known. A neighbor company then started a program and has just completed it. All the information either company obtained had been in print three years before the first company started its program. Total cost about $250,000. Sounds like government activity, but both companies are rich and earn large profits.

* * *

The perpetual question among men responsible for welding costs when dealing with arc welding is: What size welding rod should be used and how much heat? The answer is simple—use all the heat the job will stand. Limitations on the amount of heat the job will stand are: Warping, cracking, sloppy appearance.

* * *

A weld should be good enough to perform the service required. It should have good appearance. Anything beyond that is waste.

LARGE USES OF STEEL IN SMALL WAYS

287th Article ◆ Shoe Trees

WHETHER or not the name prompted the selection of the material, shoe trees for many years were manufactured largely of wood. More expensive types still use wood for the toe and heel section, but usually some sort of steel connecting strip is employed for the clamp. Wood lends itself well to accurate shaping of the tree to the contour of the shoe, but its fabrication is relatively expensive.

A few years ago a large stamping company, visualizing a market for an inexpensive shoe tree, started the manufacture of an all-steel tree. Stamping most of the parts from flat-rolled steel, costs were reduced to a fraction of those for producing the wood type of tree, and the market for this commodity was broadened sharply. Many unwilling to pay several dollars for a pair of shoe trees found a serviceable article available for 19 cents; sales spurted and the steel industry added several hundred extra tons of business to its books annually.

Men Favor All-Steel Type

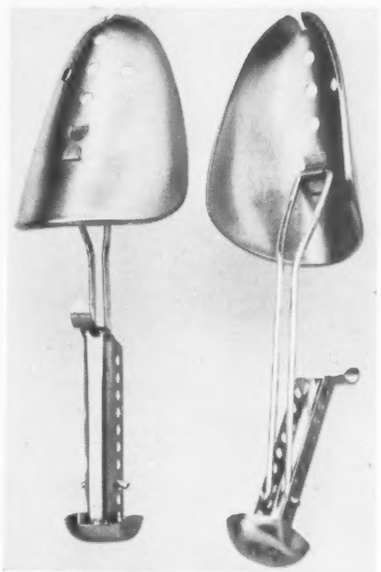
A small tonnage of steel is required in the manufacture of wood shoe trees, strip being the material commonly used. For women's shoes a popular tree consists of small toe and heel sections, made of wood, joined by a strip of spring steel which furnishes the necessary compression. While this is an inexpensive article it is unsatisfactory when used with the heavier shoes worn by men, and a more substantial tree is necessary.

The all-steel shoe tree illustrated is made in two styles to accommodate women's and men's footwear and is adjustable in length. Indicative of the need for an inexpensive tree of sturdy construction, about 75 per cent of sales of this product since its introduction has been to men.

These trees are light, a pair of the men's size weighing 9 ounces and the women's 7 ounces. Production recently has averaged more than 100,000 pairs monthly, or an indicated steel consumption of more than 300 tons annually.

Fabrication chiefly comprises stamping operations. The toe and heel sections are blanked from cold-rolled strip steel fed into the presses from coils and then formed to shape. Five separate pieces are required for each tree, these being the toe and heel plates, the heel clamp, the wire joint and the clip for attaching the wire to the toe plate. The toe plate is made from 0.025-inch strip, while the heel plate is 0.030-inch section and the clamp to which the heel plate is affixed is 0.035-inch thick. Holes are punched in the heel clamp in order to adjust the length of the tree to accommodate different sizes of shoes.

No. 9 wire is used for the connecting member and is formed by an automatic machine. Individual parts of the tree are bath cleaned before assembly.



—A & J Kitchen Tool Co., Chicago

One style of adustable-length all-steel shoe tree, produced in lots as high as 100,000 pairs monthly. Weights range from 7 to 9 ounces

Develops Steel Truss Rod To Support Axle Housing

A new truss rod to support the rear axle housing of motor trucks recently was placed on the market by Maremont Automotive Products Inc., Chicago. It is designed for use on Ford, Chevrolet and Dodge trucks to prevent damage resulting from overloading. This support overcomes the tendency for the rear housing to spring when the truck is loaded beyond its normal capacity with consequent danger of oil leaks, axle shaft breakage, worn gears and bearings and excessive tire wear.

The unit is made up of two cast brackets, which are attached to the housing by bolts, and the supporting rod. Brackets are malleable iron. The rod, ¾-inch in diameter, is a carbon steel bar. The rods are sold as accessory rather than original equipment on trucks.

New Process Gives Black Finish

A LUSTROUS black finish for articles fabricated of iron or steel has been developed by the Alrose Chemical Co., Providence, R. I. It is known as the Jetal process and utilizes an aqueous bath of comparatively low temperature. No plating, spraying or baking is required.

The bath is prepared by dissolving Jetal salts in water at room temperature and then heating, either by gas, oil or steam to the temperature range of 275 to 293 degrees Fahr. The articles are then immersed for about 5 minutes, removed and rinsed.

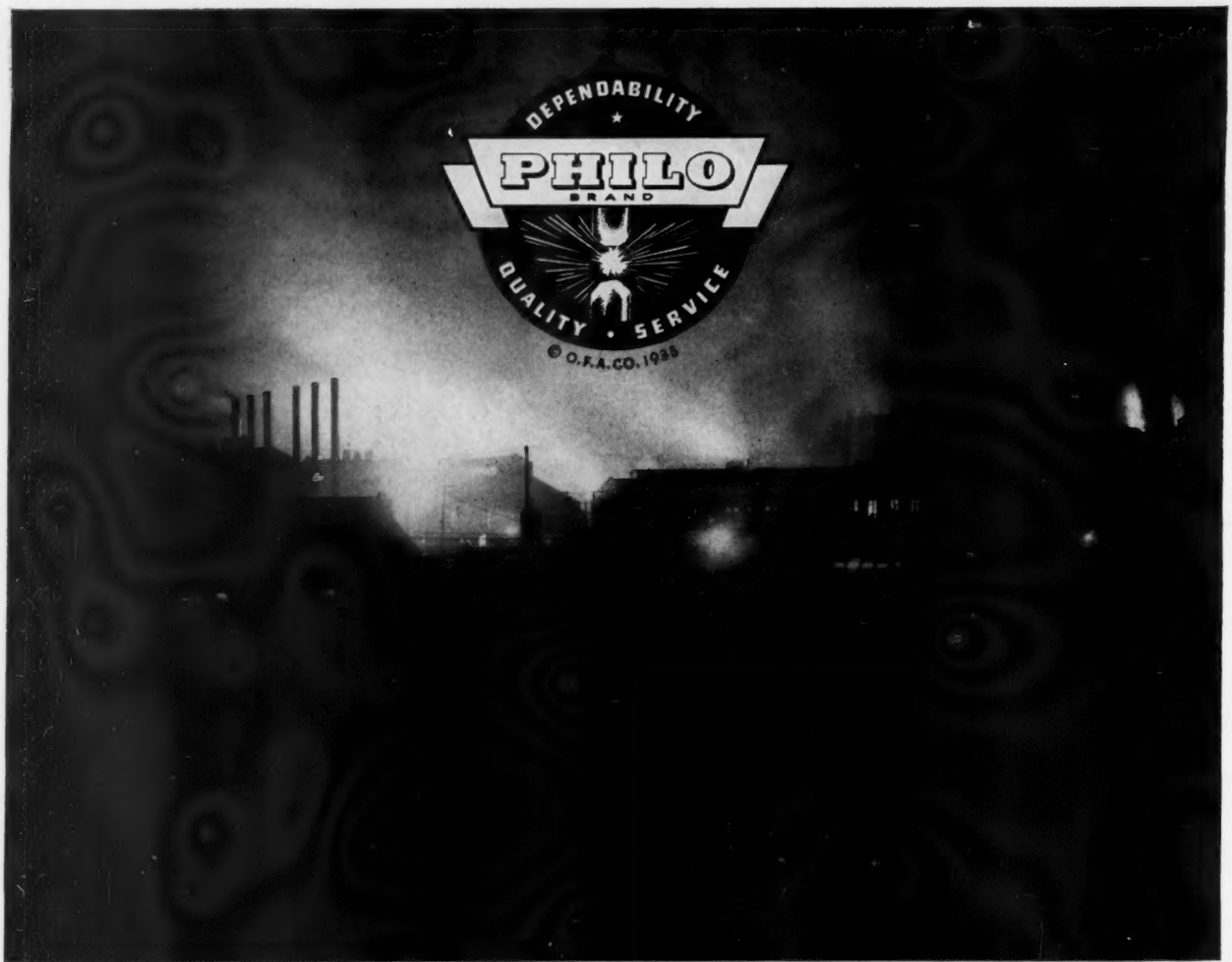
Work to be colored can be handled in bulk, on racks, in baskets or barrels. Preliminary cleaning does not have to be as thorough as for plating but all oxide or rust must be removed by ordinary cleaning methods, such as alkaline or pickling baths.

Penetrates Surface of Metal

The finish does not change dimensions of the articles but becomes part of the metal itself and will not chip, peel, scale or discolor. It is also scratchproof. It can be stamped and shaped without impairing the surface and also forms bond for any subsequent coating such as lacquer, varnish or enamel. Moreover, it can be applied to work having a high degree of polished surface without dulling the luster.

This finish is claimed to give protection against rust on articles intended for indoor use. For use outdoors, a final application of oil or wax emulsion is recommended.

The process can be used on many types of articles—from strip steel and other ferrous materials, to a wide range of various finished articles. It is now being used on screws, bolts, office appliances, tools, machine parts, auto accessories, hardware, typewriters, guns and the like.



One of the plants

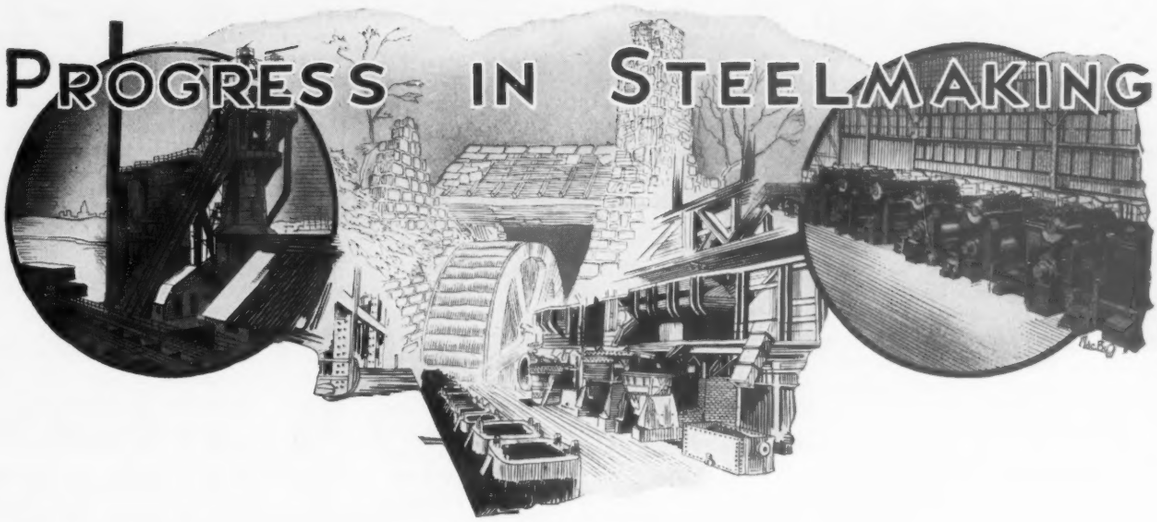
WHERE **FERRO-ALLOYS**

GO INTO THE PRODUCTION

OF BETTER STEELS ★ ★

Ohio Ferro-Alloys Corporation

Canton, Ohio



New Coating Is Acidproof

Resistant to acids, alkalies, brines, oils and greases is a characteristic of a newly devised coating. The product is for application to metal, concrete, stone, masonry, wood and plaster and contains resin. The latter is composed principally of rubber hydrocarbon derived from crepe rubber, thus supplying a cover with some of the physical properties of rubber. This covering, it is claimed, does not permit fume or liquid penetration and is resistant to heat up to 300 degrees Fahr. temperature and will make a hard glossy finish. Application is by spraying, brushing or dipping.

• • •

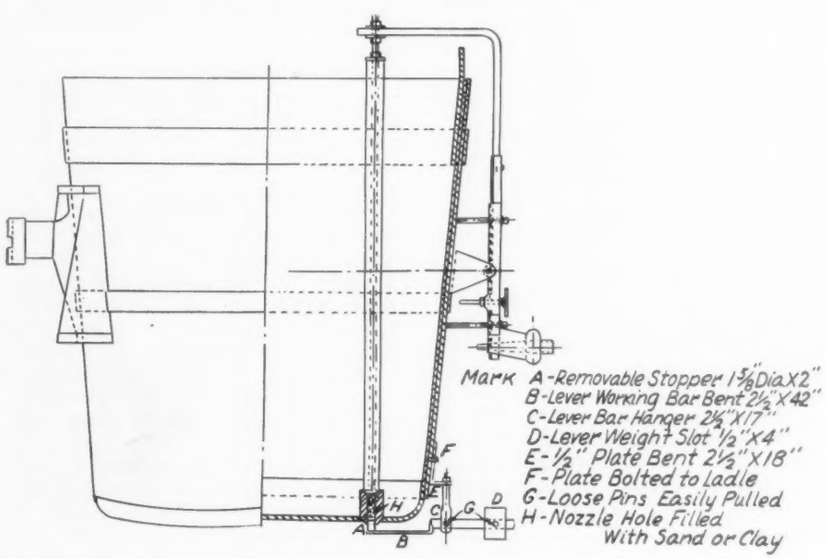
Power Savings Are Effected

Molded bearings of the laminated, phenolic resin type are effecting a power saving of approximately 25 per cent in the finishing stand of an Eastern skelp mill, as compared with the babbitt-bronze insert bearings which they replaced. They are outwearing the latter type bearings in a ratio of at least 15 to 1. The only lubricant with the nonmetallic bearings is water, of which large quantities are required. Experience at this and other Eastern mills is that the new molded bearings have a wide range of usefulness where the mill speed is not too low and where the rolling pressures are not too high.

• • •

Simple Rigging Prevents Leaky Ladles

DRIBBLE THROUGH NOZZLE IS AVOIDED—Frequently at open-hearth shops while the heat of steel is being tapped from the furnace the ladle starts to leak around the pouring nozzle. To prevent "leakers" and to obviate the use of sand or clay around the stopper head on the interior of the ladle are two of the purposes of the device designed by F. B. McKune, open-hearth superintendent, Steel Co. of Canada Ltd., Hamilton, Canada. After the ladle of steel arrives at the pouring platform the small bolt, designated "G," is withdrawn which allows the lever assembly to be removed. The nozzle hole then is cleared of sand or clay by means of a hook. The rigging, which solves the problem of leaky ladles, can be built at low cost



Speeds Surface Treatment

Oxyacetylene torches with five to nine jets now are available for surfacing ingots, slabs and billets.

• • •

Markets Light-Weight Metal

One of the purposes of a newly developed steel is to reduce dead weight and increase pay load capacity in the transportation industry. The new metal, which has a minimum yield point of 70,000 and a minimum tensile strength of 90,000 pounds per square inch, welds with ease, cold flanges readily and offers the necessary resistance to corrosion that permits the use of lighter sections without failure.

• • •

Solves Lubricating Problem

Ineffective lubrication of a worm drive on the hoist of a soaking pit crane, caused by high tooth pressure is remedied by the installation of a motor-driven oil pump which maintains a steady stream of oil on the worm while the crane is in service.

Modern Steels and Weight Reduction

(*Continued from Page 44*)

applications for weight reduction have been mentioned but large tonnages of the strong alloy steels might be used to advantage generally for machinery and industrial equipment including, especially, moving parts. In some instances, increased resistance to abrasion and heat accompanies increased strength. This is not always the case but the manganese steels and some of the low-chromium steels have given excellent service under abrasive conditions encountered in such applications as coal, ore, and stone screens and chutes. Mine and other industrial cars are especially good prospects for high-strength or light-weight construction. Excavating, especially drag-line equipment, is a likely weight reduction application. Centrifugal pumps and lines handling abrasive pulp in metallurgical plants are suitable applications for the abrasive and corrosion resisting steels.

Design and Fabrication

Higher strength steels permit considerably higher working stresses over those allowable with plain carbon or mild steels. In many cases a value of 25,000 pounds per square inch for combined stresses has been used in comparison with 16,000 pounds per square inch for regular carbon steel. On account of steel's higher modulus of elasticity, deflection may be much less with it than with other metals for the same stress, thus affording more leeway for lightening structures without loss of rigidity. Reduction in section modulus resulting in a greater deflection and less rigidity may be a limiting factor in reducing weight but can generally be overcome by suitable design.

Details of design assume much more importance in applying stronger materials and decreasing weight. Conventional designs can not always be followed. For example, it is difficult to obtain maximum weight saving in flat panels without corrugating, crimping or paneling the sheets or strips for stiffening and avoiding distortion of the flat surface.

Some of the high-strength steels may be formed cold or hot. The latter requires a non-air-hardening steel, if the formed part is to retain maximum resistance to failure in service. In many important applications, it is possible to form these steels cold by pressing or bending, especially if effort has been made to reduce the severity of the forming by decreasing depths of draw or increasing radii.

Lighter sections and lighter gage sheets and strip require more care in fabricating. In changing to thinner and lighter sections, these considerations should be kept in mind. Difficulties encountered with high-tensile steels are not always characteristic of the metal itself but may be due to improper design or design beyond limitations of decreased thickness. Spring-back in forming is slight in bends over small radii but may be as much as 25 per cent over larger radii. The higher yield point requires greater force to produce deformation. However, reduction in thickness usually reduces press load so that extensive changes are not required in shop equipment. Slightly more power, possibly 25 per cent, is required in punching low-alloy high-strength steels. Special equipment is not necessary in working many of the low-alloy high-strength steels, an important factor in their rapid application.

Rivets, in smaller sizes for cold driving and larger sizes for hot driving are supplied in some of the high-strength steels. Such steels flow well and the hole is tightly filled. It is essential that such steels are not "cold short." Slightly higher riveting temperatures are required.

No Difficulties in Welding

Low-alloy steels, especially the manganese and low chromium steels, are welded readily by usual methods and equipment. Air hardening and structural changes which weaken the metal must not be characteristic of the steel. Steels are available which meet these requirements. Welding technique, especially in spot welding, must be adapted to the steel and the design. Corrosion is generally not a factor in welded joints but welding rod, coated and uncoated, is available for the more corrosion-resisting steels in case special conditions require this precaution. Success with which low-alloy high-strength steels may be welded is indicated in Fig. 1, representing a welded tank which did not leak following hammer tests and repeated drops from considerable height after filling with water.

Light-weight design and construction are favored by the availability of some of the newer steels in shapes, plates, bars, strip, sheets, rods, wire products, pipe and tubular products. New American Railway association Z-bar sections have been made available in light shapes for car construction. These assist in lowering labor and fabricating costs which are an important factor in weight reduction economics and may fix the limit for effective reduction. Changes in design are not only possible but desirable to take advantage of the better physical properties of the steel.

In a program of weight reduction, the greatest economies are effected where decreased weight permits increase in load. Expressed popularly this represents an increase in "pay load" and a reduction in "dead load." The return upon weight reduction is largest where the proportion of dead load to live load is high and where transportation costs are high.

The most economical results require a consideration of first cost, maintenance, operating cost and depreciation. Decreased cost of operation accounts for the larger saving. This introduces strongly the factor of corrosion resistance in the selection of suitable steels for many applications, including the important one of freight cars.

Freight Cars Lucrative Field

Freight cars may be selected as a typical weight reduction application for further consideration. This is a large field for steel tonnage and also a promising one for the use of high-strength steels. The ratio of the freight car dead weight to pay load has increased materially during the last decade or so. Advisability of weight reduction is favored by increased speed of moving freight trains and by competition of other means of transportation.

Light-weight open cars of the hopper type will show large savings and if properly designed and constructed, the investment in new cars will be self-liquidating. Box cars seldom are loaded to capacity. Savings with this type of car will result from a reduction in tare ton mileage.

Typical weight reduction applications with savings accomplished are indicated in Table V. It is difficult to compare weights of modern high-speed streamlined passenger equipment with that of the conventional type. However, such trains built of high-tensile steels show such substantial economies that a new era in equipment is generally recognized. Savings effected are very large and are due not only to the reduction in dead weight but to revolutionary changes in motive power and operation. A comparison is made in the table of the large weight savings possible with passenger equipment constructed of high-strength steels and similar equipment constructed of plain steel. Under conditions most favorable to light construction, operating savings effected through the adoption of modern rapid transit equipment repay the higher first cost of the better steels employed in little more than a year.

Comparisons of weight savings through use of high-strength steels in freight equipment may be made readily by reference to Table V. These savings are so important and the resultant economies of operation appear so large that consumption of steel for this type of equipment may

well show a large increase for the first time in many years if suitable application of some of the high-strength steels is made.

Another application upon which evidence is available covers replacement of mild steel by high-strength steels in the gasoline and oil tanks for truck transportation. Larger reductions in weight have been made.

Reduction in dead weight of cars is shown to be from 20 to more than 40 per cent of the conventional weight. Because many of the applications have been of an experimental nature, in which full advantage may or may not have been taken of the properties of high-tensile steels, and because these designs will lead to further refinements, it is logical to believe that total reductions in weight of future high-tensile steel cars will approach and even exceed from 40 to 50 per cent.

Porcelain Enamel Institute Discusses Market Improvement and Expansion

SELF-REGULATION of industry depends on the co-operation and not the coercion of those associated with industry, stated R. W. Staud, president of the Porcelain Enamel institute which held its fifth annual meeting at Hotel Statler, Cleveland, May 22. President Staud in discussing market expansion recommended that the institute publish methods of cost accounting, organize to study the problem of industrial relations, make an effort to increase membership, establish contact with the federal housing corporation, organize an architectural and building service in view of the increase in building, endeavor to prevent the misuse of the term "porcelain enamel" and, that it should give increased attention to the matter of tariffs and import duties.

C. R. Stevenson, member of Stevenson, Jordan and Harrison, Chicago, in speaking on "How an Industry Policy Insures Business Profits" emphasized that the development of markets and an orderly method of handling markets must be considered jointly. There is no use in spending time and money on development, he pointed out, unless it results in a profit. Management, he stated, cannot operate a business at a profit unless industry is organized. The speaker predicted good business conditions over the remainder of this year and extraordinary business from 1936 through 1938. In conclusion, he urged members of the enamel institute to translate this business into reasonable and fair profits.

The porcelain enamel industry has made tremendous progress during the past eight years in the firing and production of porcelain enamel work according to A. M. Sweeney, General Electric Co., Schenectady, N. Y. Co-operation from frit manufacturers, he pointed out, has effected tremendous savings in the process of porcelain enameling. The speaker mentioned that over 20 per cent of the sales of electric refrigerators last year were porcelain enamel units.

As a result of the production of more opaque whites electric refrigerator manufacturers are able to make inner linings with one coat of white. Chippage has been greately reduced and for this reason, the speaker pointed out, it may be possible to make outer cases for refrigerators in one piece. If the standard of white could be lowered, Mr. Sweeney pointed out, refrigerator manufacturers perhaps could work to a one coat white and thus swing more work to porcelain enamel finish.

Educating the trade and sales people on the selling advantages of porcelain enamel has been effected by the demonstration of enameling in department stores and by the display of a sound slide film, according to R. A. Weaver, Ferro Enamel Corp., Cleveland.

Public Dictates Finish

The public decides what finish should be on merchandise, stated R. H. Turk, Porcelain Enamel & Mfg. Co., Baltimore. The speaker cited stainless steel, chromium and electroplating as strong competitive finishes in present day markets. In view of the large expenditure for the housing program in this country, the speaker urged that the proper data and specifications on porcelain enamel products be placed immediately at the disposal of architects. At least two companies in this country have been successful in the manufacture and marketing of porcelain enamel sinks. Dies have been made for the manufacture of pressed steel bath tubs, lavatories and basins, the speaker announced, and these products soon will be available for distribution.

R. G. Calton, vice president, Tennessee Enamel Mfg. Co., Nashville, Tenn., was elected president of the institute. Other officers elected were as follows: Vice presidents, F. E. Hodek Jr., General Porcelain Enameling & Mfg. Co., Chicago and E. L. Lasier, vice president, Titanium Alloy Mfg. Co., Niagara Falls, N. Y.; treasurer, W. Hogenson, president, Chicago Vitreous Enamel Products Co., Chicago, Ill.; and secretary, K. R. Groener.

The executive committee elected to serve for the next year follows:

Sign Division—George S. Blome, vice president, Baltimore Enamel & Novelty Co., Baltimore; and F. E. Hodek Jr., General Porcelain Enameling & Mfg. Co., Chicago.

Table Top Division—W. H. Brett, secretary, Enamel Products Co., Cleveland; and R. W. Staud, assistant to president, Benjamin Electric Co., Des Plaines, Ill.

Jobbing Division—E. S. Smith, president, Toledo Porcelain Enamel Products Co., Toledo, O.; and L. Ingram, president, Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

Frit Division—H. E. Ebright, Ferro Enamel Corp., Cleveland; and W. R. Greer, vice president, Porcelain Enamel & Mfg. Co., Baltimore.

A board of trustees, composed of five representatives of each of the institute's five divisions, was selected as follows:

Frit Division—W. Hogenson, president, Chicago Viterous Enamel Products Co., Cicero, Ill.; R. A. Weaver, Ferro Enamel Corp., Cleveland; E. L. Lasier, Titanium Alloy Mfg. Co., Niagara Falls, N. Y.; W. R. Greer, Porcelain Enamel Mfg. Co., Baltimore; and O. Hommel, O. Hommel Co. Inc., Pittsburgh.

Table Top Division—W. H. Brett, Enamel Products Co., Cleveland; E. H. Weil, Vitreous Steel Products Co., Cleveland; R. W. Staud, Benjamin Electric Mfg. Co., Des Plaines, Ill.; M. N. Hurd, Ingram-Richardson Mfg. Co. of Indiana, Frankfort, Ind.; and R. G. Calton, Tennessee Enamel Mfg. Co., Nashville, Tenn.

Jobbing Division—E. S. Smith, Toledo Porcelain Enamel Products Co., Toledo, O.; G. Osterle, United States Porcelain Enamel Co., Los Angeles, Calif.; P. R. Clipp, Roberts & Mander Philadelphia; W. Mahoney, Chattanooga Stamping & Enameling Co., Chattanooga, Tenn.; and L. Ingram, Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

Sign Division—G. S. Blome, Baltimore Enamel & Novelty Co., Baltimore; E. F. Guth, E. F. Guth Co., St. Louis; M. J. Saltzman, Porcelain Metal Inc., Brooklyn, N. Y.; J. T. Penton, California Metal Enameling Co., Los Angeles, Calif.; and F. E. Hodek Jr., General Porcelain Enameling & Mfg. Co., Chicago.

Co-operating Membership Division—Bennett Chapple, American Rolling Mill Co., Middletown, O.; L. D. Landrum, Harshaw Chemical Co., Chicago; R. L. McGean, McGean Chemical Co., Cleveland; F. S. Corrigan, General Steel Wares Ltd., Toronto, Canada; and L. D. Mercer, Republic Steel Corp., Youngstown, O.

Steel Is Desulphurized by Addition of Beryllium

BY W. KROLL
Consulting Metallurgist, Siemens & Haske, Germany

THE metal beryllium already has enriched industry with valuable new possibilities. Copper beryllium alloys with 2.5 per cent of this element are improved by aging and attain a tensile strength of 185,000 pounds per square inch, an elongation of 1 per cent, a brinell hardness of 365 and an electrical conductivity 32 per cent that of copper. Nickel beryllium alloys, which are similarly improved by aging, exhibit a brinell hardness of 422, a tensile strength of 176,000 pounds per square inch with 25.2 per cent elongation with a 4-inch test length. Such values as the latter are not obtained even with the most highly alloyed steels. Beryllium steels, especially those containing nickel can be age-hardened similarly.

The accompanying article taken from Metallwirtschaft, volume 13, January 1934, pages 21 to 23, was translated by Richard Rimbach, Pittsburgh.

The highest tensile strength for stainless steels containing beryllium are unfortunately recorded only in the alpha region. These do not possess the stability against corrosion of the austentitic stainless steels. The beryllium steels are also precipitation hardened in the gamma region which is of positive value in the development of Invar and Elinvar steels containing beryllium. These unusual properties concern only the alloy expert.

Fig. 1—Melt with 10.1 per cent sulphur and 3.04 per cent beryllium. Approximately full size

Fig. 2a—Hot short piece with 1.2 per cent sulphur. Magnification 2X, reduced by one-half

To the metallurgist, beryllium also offers heretofore unequalled useful possibilities. The affinity of this element for oxygen is so great that it is able to displace the active reducing elements from their oxygen compounds. Beryllium oxide is reduced only slightly by potassium while aluminum, for example, in the form of an iron-aluminum alloy, is able to reduce only traces of beryllium from a liquid beryllium oxide slag. On the other hand alumina largely is reduced by beryllium, and the equilibrium inclines strongly in the direction of the formation of BeO, beryllium oxide[1].

It has proved instructive especially on the basis of the behavior of beryllium to oxygen, to investigate the affinity of this element to sulphur, phosphorus, arsenic, etc., in molten metals. These elements usually are harmful in alloys, especially in iron, and their removal is of considerable industrial value. If iron sulphide is melted in a suitable crucible, a violent reaction takes place upon the addition of beryllium from which is obtained a regulus divided into layers, the upper part of which consists of beryllium sulphide low in iron, and the lower part of sulphur free iron. Fig. 1 shows the section through an alloy of iron with 10.1 per cent sulphur which has reacted with 3.04 per cent beryllium. Beryllium sulphide is a slowly decomposable greenish colored material which smells faintly of hydrogen sulphide. In water beryllium sulphide decomposes much more slowly than calcium sulphide. The desulphurized regulus, even with unbelievably high-sulphur content, is still capable of rolling after the addition of beryllium.

[1]Ueber die Reduzierbarkeit des Beryliumoxydes. Wissenschaftliche Veroeffentlichungen aus dem Siemens-Konzern, Vol. 11, 1932, page 88.

Rolling Destroys High-Sulphur Ingot

Fig. 2a shows an alloy ingot with 1.2 per cent sulphur after the first pass through the rolls. It is evident that it is entirely destroyed. In Fig. 2b is a rolled strip of the same alloy which however has been desulphurized with beryllium and shows the following composition: 0.76 per cent sulphur, 0.53 per cent beryllium. In spite of the high-sulphur content, it is possible to roll the plate without flaws and edge cracks. The same sheet as shown by Fig. 2c, may be bent sharply to 180 degrees while cold. The astounding fact is that it is possible to roll an iron with a high-sulphur content after the addition of beryllium and yet have the sulphur content of the sheet well beyond the red-short limitation.

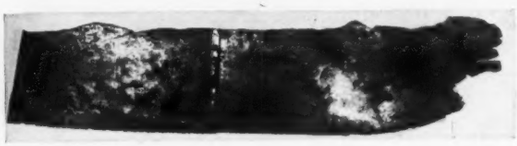


Fig. 2b — Rolling test. Sulphur 0.76 per cent, beryllium 0.53 per cent. One-half full size reduced one-half

From the chemical standpoint the desulphurizing of a metal consists in the highest possible reaction of an added element with the contained sul-

Fig. 2c—Bending test. About one-half size

phur whereby a sulphide is formed. Desulphurizing is perfect, chemically speaking, when the reaction resulting in the formation of sulphide is complete. The metallurgist sometimes considers desulphurizing imperfect as long as the sulphide formed remains in the metal. He dislikes such sulphide inclusions, as for example manganese sulphide when these are active only as foreign constituents and the sulphur of the grain boundary is in solution.

A steel, which is both desulphurized and naturally desirable, results when these inclusions escape and collect as a slag on the surface. Hereafter distinction must be made between a chemical and mechanical physical desulphurizing. The desulphurizing agents known up to the present have been incompletely effective in the chemical sense and leave still more to be desired for mechanical physical desulphurizing. Aluminum can not be considered as a desulphurizing medium in steel mill practice.

Chemical desulphurizing is entirely satisfactory [2] but the sulphur remains in the grain boundary in the form of aluminum sulphide or ternary compound with iron and the steel remains red short. Chromium in large amounts, acts as a powerful desulphurizer. Also manganese up to a certain amount in steel neutralizes the effect of sulphur.

The reaction between sulphur in steel and beryllium proceeds quantitatively with separation of beryllium sulphide. The chemical desulphurizing of steel by means of beryllium therefore is perfect. The sulphur formed appears to be decreasingly soluble in the mass with decreasing temperatures, so that a separation as a lighter material results in the course of cooling and solidifying. With sufficient content beryllium sulphide a separation into layers occurs whereby this compound separates on the surface in molten state. With smaller amounts it remains in the metal mass not confined as inclusions in the grain boundary. By using suitable slag baths the beryllium sulphide formed can be collected, and the sulphide which is bound up in consequence of its solubility in the slag, may be removed. Suitable slags are those which are not decomposed by beryllium and highly basic, especially containing calcium oxide and barium oxide with lower melting points which recently have been investigated by Wartenberg. [3]

As further proof of the behavior of beryllium in sulphur-containing molten iron are included the rolling tests given in Fig. 3, whose chemical composition is given in the accompanying table. The test "A" was conducted without beryllium; "B" with beryllium. In all cases test "A" is red short; test "B" easily is rollable even though the sulphur content was as high as 0.4 per cent. Also a mechanical-physical desulphurizing action has taken place, as for example in sample 2323B, where the sulphur content of 0.465 per cent has decreased to 0.192 per cent.

The Baumann prints according to Fig. 4 shows the taking up of the sulphur content through transition in a beryllium sulphide slag, which has separated on the surface. There remains however, in the alloy so much sulphur that the cut appears darkened throughout. According to the formula only 9.1 grams beryllium are required for 32 grams sulphur. A small excess of several hundredths

(*Please turn to Page* 68)

Fig. 3—Influence of beryllium on the desulphurization of iron. One-third size

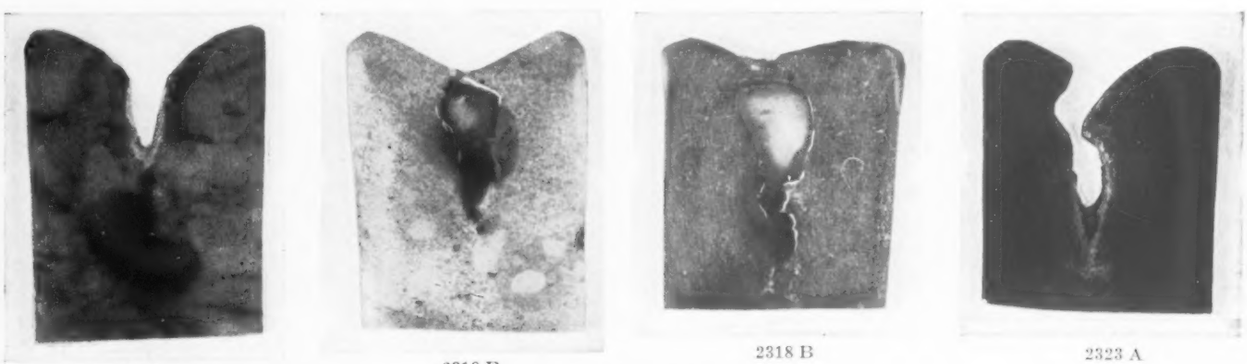
Composition of Tests in Fig. 3

Number	Carbon, per cent	Sulphur, per cent	Beryllium per cent	Rolling
2317A	0.15	0.450	.....	hot short
2317B	0.15	0.339	0.74	good
2318A	0.16	0.395	.....	hot short
2318B	0.16	0.414	0.31	good
2321A	0.06	0.170	.....	hot short
2321B	0.06	0.179	0.12	good
2323A	1.07	0.465	.....	hot short
2323B	1.07	0.192	0.39	good

[2] P. Roentgen. Herstellung und Elektrolyse von Schwefelaluminium, Metallwirtschaft, Vol. 12, 1933, page 431.

[3] Zeitschrift fur anorganische und allgemeine Chemie, Vol. 208, 1932, page 369.

O. Ruff. Zeitschrift fur anorganische und allgemeine Chemie, Vol. 213, 1932, page 333.



2318 A 2318 B 2318 B 2323 A

Fig. 4—Baumann's sulphur prints

Welded Steel Plate Bulkhead For Oil Tankers Performs Favorably in Tests

IN THE presence of a large group of naval architects, marine engineers and marine insurance experts, including high officers of the United States navy, Lukens Steel Co., Coatesville, Pa., on May 21 successfully demonstrated the strength of its new type of welded steel plate bulkhead construction for oil tankers.

In this system, the complete bulkhead is composed of a series of pressed plates, joined into a single unit by welding. Each compressed plate combines two elements, an elliptical bulge and one-half of a channel-shaped member. The channel-shaped member is completed when two pressed plates are welded together.

The elliptical bulge transmits its share of the fluid pressure load to vertical webs by a complicated form of hoop tension. The channel transmits a share of the fluid pressure load to the same vertical web and preserves the transverse continuity essential for whatever diaphragming action may be necessary.

Weight Saving Appreciable

Bulkheads constructed by this system, the company estimates, will weigh about 26 per cent less than conventional bulkheads, with an accompanying reduction of about 30 per cent in the stiffener area and of about 32 per cent in the number of parts required in constructing the bulkhead. It reduces by about 61 per cent the number of parts to be assembled by the shipyard and by about 51 per cent the amount of welding to be done at the shipyard.

The cost of this proposed bulkhead system for tankers is said to approach or be less than the cost of conventional riveted bulkhead systems. Exact cost will depend on the number of dies required to produce the sizes of pressed steel bulge plates which will be specified by the naval architect for each particular ship construction job.

"To give some idea of the utilization of these plates in a proposed all-welded tanker," states the company, "it is to be noted that about 1050 separate buckle plates of possibly two or three sizes will be required. The boat under discussion is 495 feet long, with a tank capacity of about 5,530,000 gallons."

Small Model Undergoes Test

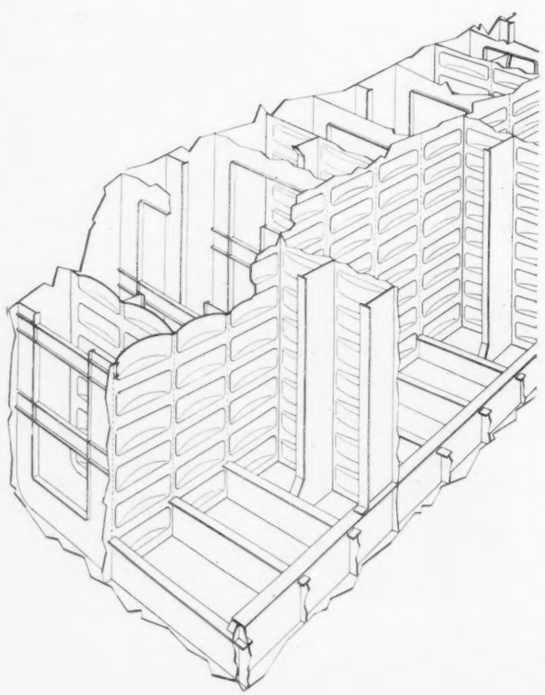
The test model was built on a ⅜ scale. It consisted of six buckle plates, all formed of 3/16-inch mild steel plate, three at the front and three at the rear. They were welded together, thus forming three convex bulges and two channels at the front and three concave bulges and two channels at the rear. The front and rear assemblies were held together at sides, top and bottom by plates 4½ inches wide, all joints being welded. The model was covered with whitewash so that when failures occurred they might be located by the flaking off of this coating.

Using a tall chimney, the company employed a head of water to test the tank. The first distortion did not occur until the pressure had been increased to 80 feet head, about three times the actual head in tanker construction. This initial distortion showed up in the form of a slight bulge in the rear channels and a slight bulge in the top rear panel. As the head was increased, the bulges became more pronounced and, at 131 feet, the rear plates and channels all bulged badly. At this pressure, which was all that the company was prepared to develop, the model showed no leakage. All of the welds, of course, held perfectly.

Two Functions Combined

"Heretofore, the typical bulkhead really has consisted of two parts—that separating the two adjacent compartments and that which stiffens the first and makes it capable of resisting water pressure on one side," says the company in reference to its new design. "The proposed construction combines in largest degree these two functions. Thus, all the usual horizontal stiffeners are eliminated and the lateral stiffness is preserved by the integral channels."

The new buckle plates are pressed in individual dies at the Lukens plant and are trimmed to size. The practice will involve welding them together in the shop into units convenient for shipment to the shipyard.



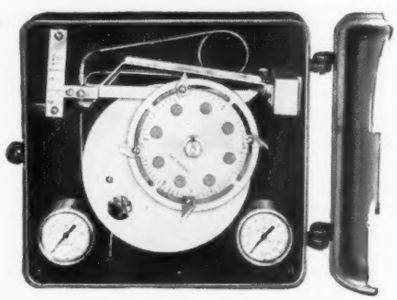
Schematic drawing showing general arrangement of proposed bulkhead system in a tanker

NEW EQUIPMENT

Time Cycle Controller—

Taylor Instrument Companies, Rochester, N. Y., recently announced a new control instrument available for the automatic, intermittent operation of diaphragm valves or other diaphragm-operated devices. The instrument, shown herewith, is available in reverse acting and direct acting types.

The intermitter as it is called, may be mounted on any diaphragm motor or, if this is not desirable, in any convenient adjacent location. Also, it is possible to operate more than one diaphragm valve or similar device from the same instrument, the number depending upon the operating conditions and the nature of the control required.



Taylor intermitter, a simplified time cycle controller

An overpressure release protects the diaphragm motor from excessive pressures in the event of reducing-valve failure. Either compressed air or gas at a constant 25 pound per square inch pressure is specified for efficient instrument performance. A water-proof, noncorrosive aluminum case with black crackle finish protects the mechanism. Pressure gages are located within the case to protect them from breakage and discoloration.

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Open End Band Saw—

Grob Bros., South Ninety-seventh and West National avenue, West Allis, Wis., is bringing out a band saw for internal sawing. The principle of the machine, shown in the accompanying illustration, is the winding up of a 150-foot saw band helically over a drum and looping it over three guide sheaves. To saw out a die it only is necessary to release the tension on the saw band, which is done by a single lever movement, remove the front end of the band fastened with a self-tightening eccentric clamp to the drum, insert it through an opening in the die large enough for the band to pass through, reconnect it to the drum and put tension on the band. Three minutes of sawing can be done at the lowest cutting speed until the end of the band has been reached at which time the machine will stop automatically.

The drum is mounted on a threaded spindle so that when revolving it screws itself back and forth, winding and unwinding the band. The drum is tapered to compensate for the saw band being heavier on the front or teeth side. A small guide wheel covered with rubberized fabric is holding the saw band tight to the drum when the tension of the band is released. This prevents the band from loosening on the drum.

Grob open end band saw for internal sawing in manufacture of tools, dies

Sawing table, 24 x 28 inches, is tiltable in two directions in such a way that the height of the center of the table does not change. This arrangement allows the saw band guide below the table to come flush with the surface of the table. Thus maximum rigidity is obtained while sawing. The saw band guide above the table is adjustable in height. Throat of the machine is 25½ inches and material up to 9 inches in height can be sawed.

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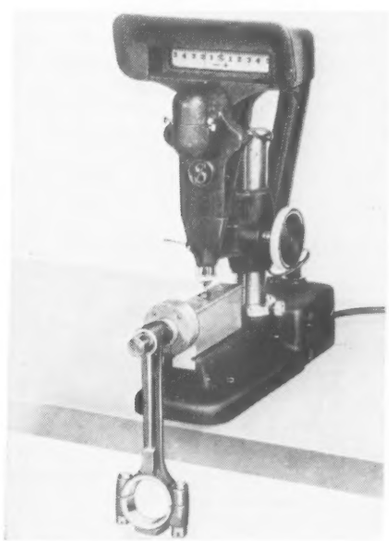
Visual Gages—

Sheffield Gage Corp., Dayton, O., recently brought out a No. 1 visual gage, shown herewith. The device is both a rapid inspection gage for close tolerance production work and also a precision comparator by which fine work shop gages may be periodically checked.

A relative movement of 0.000025 inch beween the anvils covers a space of ⅛-inch or one unit on the illuminated dial. A difference of 1/10000-inch in anvil setting moves the indicator ½-inch along its scale.

The heart of the gage is a patented reed mechanism consisting of four flat reeds so arranged that when a part is inserted between the anvils, one set of reeds is put in compression and the other set in tension. The movement resulting from the equalization of these stresses causes the pointer to move across the reading scale.

The upper gaging element is diamond tipped to minimize all effects of wear. The lower anvil is fur-



No. 1 visual gage developed by Sheffield Gage Corp. for precision work

nished in two interchangeable types, one flat for the gaging of flat surfaces and outside cylindrical diameters; the other, of a mandrel type, for gaging internal diameters.

The No. 3 visual gage differs from the No. 1 in that it operates on a 1000 to 1 magnification instead of 5000 to 1 magnification. A relative movement of 0.0001-inch between the gaging elements registers a distance of ⅛-inch on the illuminated dial. Except for the difference in sensitivity, the No. 3 instrument is essentially the same as the No. 1 gage. Both utilize the reed mechanism.

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Switches for Hazardous Gas Locations—

Allen-Bradley Co., 1311 South First street, Milwaukee, has announced that its type G explosion-proof enclosure, heretofore supplied

Allen - Bradley solenoid - operated switch embodies explosion-proof enclosure

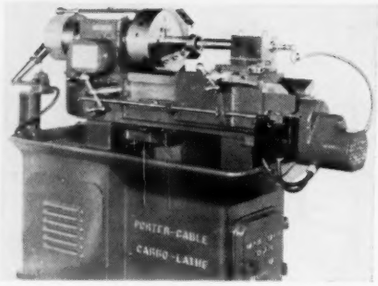
only for size 1 bulletin 709 solenoid-operated across-the-line switches, now is available for the sizes 2 and 3 switches for polyphase motors up to 15 horsepower, 110 volts; 30 horsepower, 220 volts; and 50 horsepower, 440-550 volts, and for self-starting single-phase motors.

The enclosure, shown herewith, is of cast iron, black enameled with a white enameled interior finish, which makes all terminals, switch parts, and overload relays stand out plainly, thus making installation and inspection easier. Heated gases, created by any accidental internal explosion, are cooled before reaching the atmosphere by the dissipation of their heat in passing between the wide-flange, machined surfaces between cover and base of the cabinet.

• • •

Electric Quick Return For Carbo-Lathe—

Porter-Cable Machine Co., Syracuse, N. Y., recently introduced an electric quick return for its Carbo-lathe. This attachment, shown herewith, in addition to quickly returning the carriage, also rapidly advances the carriage. It consists of a separate electric motor attachment which is fastened to the end of the



Electric quick return features new Porter-Cable Carbo-lathe

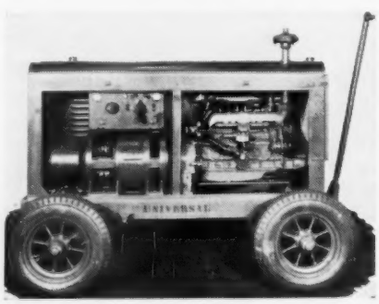
lathe bed by four cap screws and two dowels. It is connected to the feed shaft running through the center of lathe bed with a flexible coupling.

Motive power is supplied by a 1/3 horsepower motor with special torque winding capable of 300 per cent overload, it is claimed. This motor is regularly furnished in 220-volt, 60-cycle, 3-phase. 440 or 550-volt units can be furnished; also two phase, but not single phase. The motor is geared to the jack shaft in the attachment with a ratio of approximately 2½ to 1. Also a spring loaded disk clutch is built into this gear drive which is adjustable so that it will just drive the carriages, but if power feed of table is engaged and the motor is started, clutch will slip, thus protecting motor and feed mechanism.

• • •

Electric Arc Welders—

Universal Power Corp., 1719 Clarkstone road, Cleveland, recently announced that its universal Staid-arc welders now are available in the gasoline engine-driven types, both portable and stationary. The generator used utilizes the same stabilizing construction as that on universal Staid-arc motor-generator sets. Generator output controls include a four-point current adjustment switch with convenient hand grip type handle, plus a rheostatic voltage control which permits close welding heat settings totaling some six hundred steps. Control panel is of the ebony



Gasoline engine-driven arc welder built by Universal Power Corp.

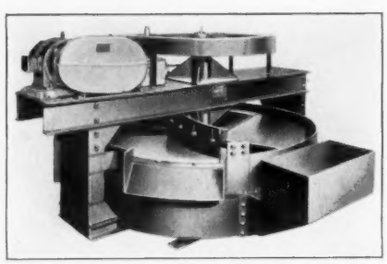
asbestos type, mounting in addition to the control handles, a zero center Weston voltmeter indicating polarity, a zero center Weston ammeter, a polarity reversing switch and the welding output studs with heavy wing nut terminals.

The engines are the Chrysler industrial six-cylinder type, equipped with either battery ignition and electric starting equipment or with magneto ignition and hand cranking. An engine automatic idling device as optional equipment is available to save gas, oil and engine wear and tear. Portable gears available includes as optional items, either small shop type wheels steel or rubber, large diameter broad rimmed steel wheels for outdoors work, and pneumatic tired wheels for street or highway use. Springs may be had on any of the models, one of which is shown herewith.

• • •

Dewatering Device—

Link-Belt Co., 910 South Michigan avenue, Chicago, has perfected a device, shown herewith, for recovering fine or coarse sand and similar material. The new machine fills the need for a sand dewatering device capable of recovering the available sand



Link-Belt dewatering Rotoscoop for recovering sand and other material

grains, of sufficient fineness to meet specifications, and discharging the product dry enough to permit truck transportation, or mechanical conveying to and from storage. It is suitable also for treating other materials besides sand, and provides a simple method of saving special grain sizes which were formerly lost in the overflow water.

The Rotoscoop, as it is known, is a self-contained machine consisting essentially of a large circular steel tank or container into which the water and the materials to be treated are introduced; a slow-moving power-driven suspended rotating disk to the underside of which are attached inclined adjustable renewable scoops for moving the material within the tank; a curved steel adjustable renewable plow mounted in a stationary position above the rotating disk, for plowing off and discharging the dewatered product

ready for use; and the necessary driving machinery mounted above the tank on the same steel supports from which the rotating disk is suspended. The machine is made in four sizes, 15, 12, 9, and 6-foot diameters, with capacities ranging from 20 to 150 tons an hour, based on material weighing 100 pounds per cubic foot.

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Grinding and Lapping Machine—

Stokerunit Corp., 5325 West Rogers street, Milwaukee, recently brought out a new machine, shown herewith, for grinding and lapping all sorts of carbide tools. Two well supported tables are provided for the tools, each being provided with means for shifting the table in relation to the face of the wheel and for accurate angular settings. A protractor which is interchangeable between the two tables is also furnished, making it possible to grind and lap tools with the same setting. The lapping disk is of high grade cast iron, charged with diamond dust and oil.

Carbide grinding and lapping machine introduced by Stokerunit Corp.

This machine also can be provided with pump, oil pan and supply tank with the wheels hooded to prevent liquid from being splashed around the machine. The pump is operated by a separate motor and can be disconnected when necessary. When used with coolant, the machine is particularly adaptable to diamond wheels.

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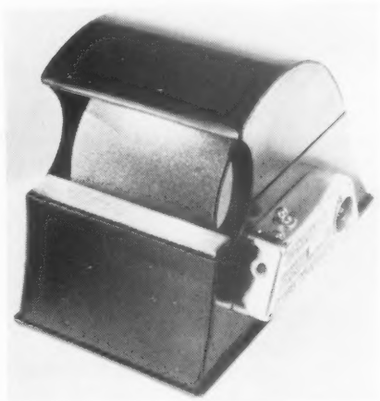
Portable Surfacer and Polisher—

Trimson Mfg. Co., Cleveland, recently brought out a portable surfacer and polisher which reflects the influence of modern styling. One of the features of this unit, shown herewith, is a light concealed in the cover and arranged to cast illumination directly on the work without glare. The lip of the cover forms a handle so that the machine may be carried from job to job.

The motor drum has a cushioned surface over which paper or cloth abrasive and polishing sheets are used. Drum is 6 inches wide and 7 inches in diameter. Surface speed is said to be almost a mile a minute. Motors operate on 110 or 220 volts, 60 cycles alternating current.

This new surfacer and polisher may be used in finishing different metals, wood, bakelite, carbon, fibre, and hard rubber. It is employed for removing burrs, cleaning and finishing castings, polishing, sanding patterns, champfering carbon brushes, sharpening tools and for many other shop uses. The machine weighs 50 pounds, is 14½ inches long, 10 inches wide and 10½ inches high.



Trimson portable surfacer and polisher embodies a unique motor

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Roll Feed—

F. J. Littell Machine Co., 4127 Ravenswood avenue, Chicago, recently brought out a new roll feed, shown herewith, to handle stock up to 16 inches in width and feed up to 36 inches per stroke of press, at a speed of 92 strokes per minute. The stock is fed directly from a power-driven reel which unwinds a loop of material, thus avoiding the necessity of the roll feed pulling the stock directly from the coil, inasmuch as it pulls from the loop only.

The press is driven by a variable drive alternating-current motor, speed of which is controlled by a handwheel on the front of the press. Speed of the motor is regulated by hydraulic control with a range of speed from 50 to 150 revolutions per minute. The feed is equipped with an automatic roll release which allows the operator to place the stock in the die just at the point where it is to be blanked. Consequently the die blanks at exactly the point where the stock is placed without first moving ahead to waste a half blank.

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ROLL feed designed by F. J. Littell Machine Co., handles stock up to 16 inches in width. Because the device unwinds a loop of stock, the roll feed does not pull the material directly from the coil, but from the loop only

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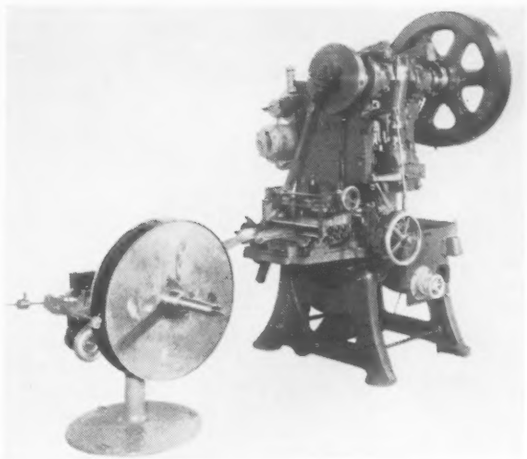

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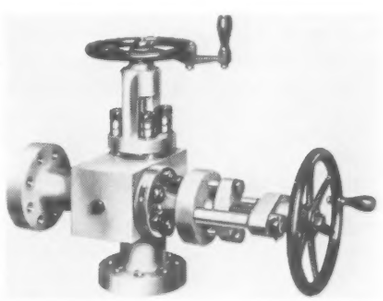
Tandem Blow-Off Valve—

Yarnall-Waring Co., Chestnut Hill, Philadelphia, is anouncing a new forged steel tandem blow-off valve, shown in the accompanying illustration. This unit, designed for 600 and 1500 pounds pressure, embodies a sealing valve of seatless construction. The blowing valve utilizes special alloys and unique construction which materially reduce normal wear on this type of valve.



Yarnall-Waring tandem blow-off valve for high pressure

Steel Is Desulphurized by Addition of Beryllium

(*Concluded from Page* 63)

of beryllium is useful. Moreover, the steel must be entirely deoxidized and no slag capable of reaction with beryllium must be allowed floating on the surface of the bath. Otherwise the amount of beryllium used becomes necessarily greater because of the reduction of foreign metals.

Through this first part of the investigation it was noticed that the desulphurizing of steels proceeds completely. A further question remains, however, namely: how carbon behaves toward an eventual excess of beryllium or in general to beryllium sulphide. A cast iron rich in sulphur (3 per cent) was treated with a slight excess of beryllium. Separation into layers occurred, the sulphur content was lowered to 0.5 per cent and the gray cast iron remained unimpaired in structure, except for the small amount of beryllium sulphide inclusion present after desulphurizing. On the contrary, it is strongly apparent that in the case of steels with a higher carbon content that less influence of the hard constituents results with a greater excess of beryllium. The view taken is that beryllium sulphide is stable against carbon in the presence of iron. On the contrary as is known beryllium is soluble in alpha-iron and it may as such disturb the carbon during hardening processes to a small extent, probably as a result of the formation of soluble beryllium carbide. At higher temperatures this beryllium carbide is similar to vanadium carbide easily put into solution.

Behavior Is Similar with Other Impurities

Against arsenic and phosphorus, which likewise occur as harmful impurities in steel, beryllium behaves similarly as previously observed. With other metals the desulphurizing is even more complete, as with nickel, which can be made rollable without magnesium by using beryllium. This clearly shows how powerful is the action of beryllium on sulphur, for as is known, in the case of pure nickel a sulphur content so low that it appears still permissible in iron, causes red shortness.

In conclusion, a complete desulphurizing of iron of all of the sulphur content can be obtained by the addition of beryllium. With high-sulphur content separation into layers takes place. With lower content the beryllium sulphide distributes itself more or less within the melt where it can be observed metallographically as inclusions. The separation of the sulphur from the grain boundary is complete so that alloys with a sulphur content of over 0.4 per cent can be rolled readily after sufficient addition of beryllium. Similar favorable actions are observed in the harmful impurities of steel arsenic and phosphorus. Cast iron likewise may be desulphurized entirely and the carbon content remains unaltered as long as no great excess of beryllium is employed. In steels a slight influence on the hard constituent is apparent with high-carbon content when a larger excess of beryllium is employed. The desulphurizing action of beryllium extends also to other metals, especially nickel, which can be made rollable without a magnesium addition. The metallurgist finds a new deoxidation and desulphurizing agent in the element beryllium, which far surpasses the additions aluminum and manganese used up to the present time. For the time being this may only become of first importance in the improvement of the properties of the best refined steels because of the present high price of beryllium.

Importance of Replacing Obsolete Mill Equipment

(*Concluded from Page* 50)

without a substantial increase in selling prices or a great reduction in operating costs.

This is a very different picture from that presented by industries which purchase raw materials in a semi-finished state and convert them quickly into finished form for sale, and where a turnover of the capital investment can be made in one year, or from certain merchandising chain stores where the capital invested is turned over five or more times per year.

Money paid to workers in the steel industry represents 41 per cent of the sales value of its products. Only 75 per cent of the ingot tonnage manufactured is shipped to the customer. Cost of repairs and maintenance is about $8 per ton of product shipped or $224,000,000 per year as an average over the past ten years. These figures offer a vivid explanation of why obsolescence is of such vital importance, and why each piece of equipment which proposes to reduce man-hours per ton, increase the ratio of ingots poured to product shipped, or reduce the cost of maintenance, must be carefully surveyed to determine its true economic value.

Harrisburg Pipe Becomes Harrisburg Steel Corp.

HARRISBURG PIPE & PIPE BENDING CO. of Harrisburg, Pa., has changed its name to Harrisburg Steel Corp., according to Wilbert Wear, president and treasurer. The sole purpose in adopting the new corporate title is to make the firm name more accurately represent the operations and products of the company. No changes in corporate set-up or in personnel at the plant or in the field are made or contemplated according to Mr. Wear.

Harrisburg Pipe & Pipe Bending Co. was started about 40 years ago as a small, localized pipe bending shop. It has never reorganized or consolidated. Other executives of Harrisburg Steel Corp. are N. W. Cassel, vice-president and treasurer, and H. B. Liggett, general manager.

Early in its history the company established a rolling mill and steel plant, producing its own skelp, pioneering in production of pipe from open-hearth steel. In 1913 the manufacture of pipe was discontinued, due to changes in economic conditions. Products now include alloy and carbon open-hearth billets, blooms and slabs; forged seamless pipe couplings; seamless steel gas cylinders; drop-forged steel pipe flanges; hollow and drop forgings; seamless steel pump liners; pipe coils and bands. During the war munitions were manufactured, and small orders for the government are occasionally handled now.

Grace Urges Caution

(*Concluded from Page* 26)

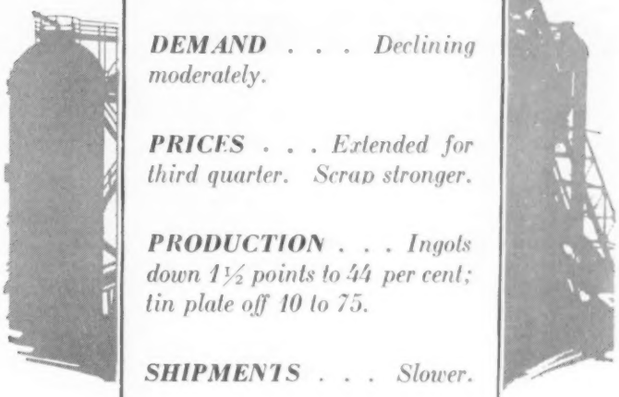
obvious that it is difficult to see how anyone who has at heart the welfare or employes and industry in this country can support it. Yet it is a measure that has received endorsement in quarters that do not or will not recognize its impracticability.

The steel industry has taken a vital interest in providing for the economic security of its employes. This it has done through co-operative plans. In some cases they have been financed wholly by the company and in others jointly by empioye and company. In any event the steel industry has an outstandingly good record over many years in providing against the hazards of sickness and death, accident, unemployment and old age.

The question of the extension of the national industrial recovery act, which expires June 16, is now before congress. Whatever the future of this act may be, if any at all, the problems with respect to the successful management of the steel industry are still before us and must be met. Certainly whatever the future holds in store for us, we should have the common sense to realize the necessity of exerting every possible effort to prevent a recurrence of the evils, abuses and unfair business methods of the past and of so managing our industry as to afford the necessary protection to all parties concerned.

Market Loses Headway; Rate Down 1½ Points

Tonnage Off, Despite Gain In Automobile Assemblies; Scrap Prices Still Rising



MARKET IN TABLOID

DEMAND . . . *Declining moderately.*

PRICES . . . *Extended for third quarter. Scrap stronger.*

PRODUCTION . . . *Ingots down 1½ points to 44 per cent; tin plate off 10 to 75.*

SHIPMENTS . . . *Slower.*

UNFAVORABLE influences predominated in the iron and steel markets last week, reducing steelworks operations 1½ points to 44 per cent.

New automotive steel commitments and shipments failed to rally as well as expected following settlement of the industry's strikes, although automobile assemblies snapped back last week to 101,000, from 90,000 in the preceding week.

Sheet and strip mill operations did not regain the ground lost through recent automotive suspensions. Tin plate production fell 10 points to 75 per cent, as canmakers' specifications declined, and mill warehouses filled up with record tonnages.

Unless there is a substantial rebound this week, which appears improbable, May—normally associated with rising industrial activity—is likely to show the lightest steel output so far this year.

Consumers generally are absorbing their stocks, buying cautiously, awaiting the outcome of labor legislation at Washington, and clarification of the NRA issue with its price-control features after June 16.

The nominal extension of prices for third quarter—now unchanged for nearly a year—has favored a continuation of short-range buying, and there are few commitments at this time for the full quarter. In the steel industry there is some discussion pertaining to the feasibility of setting up a trade body to enforce fair prices, should the steel code be abandoned.

Considerable steel tonnage remains to be placed by automobile manufacturers for June; tractor and farm implement production is counted on to continue at an undiminished rate through the month; wire and wire fencing orders are the best since January, and considerable dependence is placed on miscellaneous manufacturing needs. But the most important factor to determine the volume of demand in the summer months, it is believed, is the speed with which the government can swing into its public works projects.

June is expected to inaugurate some of the structural work previously planned, for which federal funds now have been allotted. Structural shape awards in the week increased slightly to 15,356 tons, including 7500 tons for the Harlem river lift span to New York's Triboro bridge. Milwaukee awarded 3200 tons of reinforcing bars, and Los Angeles 5150 tons of cast pipe.

Pere Marquette has purchased 1200 tons of rails and splice bars, while the Grand Trunk is taking bids on 2500 tons of tie plates.

Scrap prices show more tangible evidence of strength, as consumers are buying to replenish stocks. Ten thousand tons of scrap rails were purchased by a Pittsburgh district steelworks at $13.50 a ton, an advance of 75 cents, while increases of 25 to 75 cents have applied on various grades in other districts. Several hundred tons of Russian pig iron are offered at Atlantic coast ports $1 a ton under the domestic code prices.

STEEL's London correspondent cables that disbanding of the French sheet cartel has led to a substantial reduction in sheet prices.

Chicago district steelworks last week dropped 7½ points to 44 per cent; Wheeling 5 to 68. Cleveland was up 3 to 54; Buffalo 5 to 37; eastern Pennsylvania 1 to 29½; New England 10 to 60. Pittsburgh was unchanged at 38; Detroit 94; Birmingham 54½; Youngstown 50.

STEEL's iron and steel price composite is up 7 cents to $32.41, due to advances in scrap; the finished steel composite is unchanged at $54, while the steelworks scrap composite is up 21 cents to $10.50.

COMPOSITE MARKET AVERAGES

	May 25	May 18	May 11	One Month Ago April, 1935	Three Months Ago Feb., 1935	One Year Ago May, 1934	Five Years Ago May, 1930
Iron and Steel	32.41	$32.34	$32.35	$32.29	$32.54	$32.97	$33.49
Finished Steel	54.00	54.00	54.00	54.00	54.00	54.80	52.60
Steelworks Scrap	10.50	10.29	10.29	10.05	12.03	11.30	13.65

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	May 25, 1935	April, 1935	Feb., 1935	May, 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.90c
Steel bars, Chicago	1.85	1.85	1.85	1.95
Steel bars, Philadelphia	2.11	2.09	2.09	2.19
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.85
Shapes, Philadelphia	2.01½	2.00½	2.00½	2.05½
Shapes, Chicago	1.85	1.85	1.85	1.90
Tank plates, Pittsburgh	1.80	1.80	1.80	1.85
Tank plates, Philadelphia	2.00	1.98½	1.98½	2.03½
Tank plates, Chicago	1.85	1.85	1.85	1.90
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	2.00
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.65
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.25
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	2.10
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.75
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.35
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60

Semifinished Material

	May 25, 1935	April, 1935	Feb., 1935	May, 1934
Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$30.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	30.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	29.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	May 25, 1935	April, 1935	Feb., 1935	May, 1934
Bessemer, del. Pittsburgh	$19.81	$19.76	$19.76	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	19.76
No. 2, foundry, del. Pittsburgh	19.31	19.26	19.26	19.26
No. 2 foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.63	20.63	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.15	24.04	24.04
Ferromanganese, del. Pittsburgh	90.13	89.89	89.79	90.24
Gray forge, del. Pittsburgh	18.67	18.63	18.63	18.88

Scrap

	May 25, 1935	April, 1935	Feb., 1935	May, 1934
Heavy melting steel, Pittsburgh	$12.50	$11.70	$13.25	$12.80
Heavy melt. steel, No. 2, east. Pa.	9.25	9.15	10.12	8.90
Heavy melting steel, Chicago	10.25	10.05	11.65	10.85
Rails for rolling, Chicago	11.25	11.05	12.55	12.15
Railroad steel specialties, Chicago	11.75	11.25	12.50	12.40

Coke

	May 25, 1935	April, 1935	Feb., 1935	May, 1934
Connellsville, furnace, ovens	$3.60	$3.60	$3.60	$3.45
Connellsville, foundry, ovens	4.60	4.60	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Prices are code levels filed with American Iron and Steel Institute, 350 Fifth avenue, New York. Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered	1.95c
Pacific ports, f.o.b. cars, dock	2.35c
Philadelphia, del.	2.11c
Boston, delivered	2.22c
New York, del.	2.15c
Pitts., forg. qual.	1.95c-2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on stright or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.....0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni. 1.05
5100 0.80-1.10 Cr.....0.45
5100 Cr. spring.....base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250.....Carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23⅞-in. Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	70-10-5 off
Rolled thread, ½ x 6, smaller	70-10-5 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	70-10-5 off
Tire bolts	60-5 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	70-10-5 off
Step bolts	70-5 off
Elevator bolts	70-5 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-5 off
Do., ½ to 1-inch	70-10-5 off
Do., over 1-inch	70-5 off

Hexagon Cap Screws

Milled	85-10 off
Upset, 1-in., smaller	87½ off

Square Head Set Screws

Upset, 1-in., smaller	80 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.
Stnd. fitgs., Birm. base...$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.60
Connellsville, fdry.	4.60
Connel. prem. fdry.	5.10
New River fdry.	6.00
Wise county fdry.	4.45- 5.25
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol		15.00c
Toluol		30.00c
Solvent naphtha		30.00c
Commercial xylol		30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63

Gray Forge		Charcoal	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.25
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

First Quality.

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00

Second Quality

Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00

Ohio

First quality	$40.00-45.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	42.50
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$13.00-14.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply

Nonferrous Prices

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
May 18	9.00	9.12½	8.00	51.50	50.25	3.90	3.75	4.25	*19.00	14.25	35.00
May 20	9.00	9.12½	8.00	51.35	50.25	3.95	3.80	4.25	*19.00	14.25	35.00
May 21	9.00	9.12½	8.00	51.35	50.35	4.10	3.95	4.25	*19.00	14.25	35.00
May 22	9.00	9.12½	8.00	51.60	50.65	4.25	4.10	4.25	*19.00	14.25	35.00
May 23	9.00	9.12½	8.00	52.00	51.20	4.25	4.10	4.25	*19.00	14.25	35.00
May 24	9.00	9.12½	8.00	52.20	51.40	4.25	4.10	4.30	*19.00	14.25	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.25
Copper, hot rolled	16.00
*Lead, cut, to jobbers	8.00
Zinc, 100-lb. base	9.50
Tubes and Pipes	
High yellow brass	16.00
Seamless copper	16.25
Rods	
High yellow brass	12.75
Copper, hot rolled	13.25
Anodes	
Copper, untrimmed	13.75
Wire	
Yellow brass (high)	14.75

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	4.75- 5.00
Cleveland	5.25- 5.50
Chicago	4.75- 5.00
*St. Louis	5.25- 6.00
Heavy Copper and Wire	
*New York, No. 1	6.12½-6.37½
Chicago, No. 1	5.87½-6.12½
Cleveland	5.75- 6.00
*St. Louis, No. 1	6.50- 6.75
Composition Brass Borings	
*New York	4.12½-4.37½
Light Copper	
*New York	5.00- 5.25
Chicago	4.37½-4.62½
Cleveland	4.75- 5.25
*St. Louis	6.25- 6.50
Light Brass	
Chicago	2.37½-2.62½
Cleveland	2.75- 3.00
St. Louis	2.75- 3.00
Lead	
*New York	3.12½- 3.25
*Cleveland	3.00- 3.25
*Chicago	3.25- 3.37½
*St. Louis	3.30- 3.40
Zinc	
New York	2.12½-2.37½
*Cleveland	2.12½-2.37½
*St. Louis	2.65- 2.75
Aluminum	
Borings, Cleveland	8.00- 8.25
Mixed, cast, Clev.	12.25-12.75
*Mixed, cast, St. L.	13.00-13.25
Clips, soft, Clev.	14.00-14.50
SECONDARY METALS	
Brass ingot, 85-5-5-5	8.00
*Stand. No. 12 Alum.	15.75-17.00

Iron and Steel Scrap Prices

Corrected to Friday night Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.00
Boston, dock, expt.	8.50
Boston, domestic	7.00- 7.25
Buffalo, No. 1	10.50-11.00
Buffalo, No. 2	9.00- 9.50
Chicago, No. 1	10.00-10.50
Cleveland, No. 1	9.00- 9.50
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1	8.00- 8.50
Detroit, No. 2	7.00- 7.50
Eastern Pa., No. 1	10.50
Eastern Pa., No. 2	9.00- 9.50
Federal, Ill.	8.00- 8.50
Granite City, R. R.	8.25- 8.75
Granite City, No. 2	7.25- 7.75
N. Y., deal, No. 2	7.00
N. Y., deal. barge	8.50
Pittsburgh, No. 1	12.25-12.75
Pittsburgh, No. 2	10.50-11.00
St. Louis	7.25- 7.75
Valleys, No. 1	11.50-12.00

COMPRESSED SHEETS

Buffalo, dealers	9.00- 3.50
Chicago, factory	8.50- 9.00
Chicago, dealer	7.50- 8.00
Cleveland	8.00- 8.50
Detroit	8.50- 9.00
E. Pa., new mat.	9.50
Pittsburgh	12.25-12.75
St. Louis	6.25- 6.75
Valleys	11.00-11.50

BUNDLED SHEETS

Buffalo	7.00- 7.50
Cincinnati, del.	6.50- 7.00
Cleveland	6.00- 6.50
Pittsburgh	10.50-11.00
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	6.00- 6.50
Cincinnati	6.00- 6.50
Detroit	5.00- 5.50
St. Louis	4.25- 4.75

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	12.00-13.00
Chicago (3 ft.)	12.50-13.00
Chicago (2 ft.)	13.00-13.50
Cincinnati, del.	11.50-12.00
Detroit	10.50-11.00
Pitts., open-hearth, 3 ft. and less	14.50-15.00
St. Louis, 2 ft.& less	12.00-12.50

STEEL RAILS, SCRAP

Boston	7.00- 7.25
Chicago	10.00-10.50
Pittsburgh	13.00-13.50
St. Louis	9.50-10.00

STOVE PLATE

Birmingham	5.75- 6.25
Boston, dealers	3.75- 4.00
Buffalo	9.25- 9.75
Chicago, net	6.00- 6.50
Cincinnati, dealers	6.00- 6.50
Detroit, net	5.75- 6.25
Eastern Pa.	8.50
N. Y., deal. fdry.	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	12.75-13.25
Chicago, springs	11.50-12.00
Eastern Pa.	13.50
Pittsburgh	14.50-15.00
St. Louis	8.50- 9.00

ANGLE BARS—STEEL

Chicago	12.00-12.50
St. Louis	9.50-10.00

RAILROAD SPECIALTIES

Chicago	11.50-12.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.75-13.25
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa., crops	13.00-14.00
Pittsburgh, billet, bloom crops	15.50-16.00
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES

Chicago	10.00-10.50
St. Louis, cut	9.50-10.00

SHOVELING STEEL

Chicago	10.00-10.50
Federal, Ill.	7.50- 8.00
Granite City, Ill	7.75- 8.25

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.00- 9.50
Buffalo, No. 2	10.50-11.00
Chicago, No. 1, net	8.50- 9.00
Chicago, No. 2	10.00-10.50
Cincinnati, No. 2	8.00- 8.50
Eastern Pa.	10.50-11.00
N. Y., No. 1, deal.	7.25- 7.75
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	8.00- 8.50

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	9.00- 9.50
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	9.00- 9.50
Chicago, No. 1	8.50- 9.00
Cinci., No. 1, deal.	6.00- 6.50
Cincinnati, No. 2	3.25- 3.75
Cleveland, No. 2	6.00- 6.50
Detroit, No. 1, new	7.00- 7.50
Valleys, new, No. 1	10.50-11.00

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	2.00- 2.25
Buffalo	4.50- 5.00
Chicago	5.00- 5.50
Cincinnati, dealers	4.00- 4.50
Cleveland	5.00- 5.50
Detroit	4.50- 5.00
Eastern Pa.	6.00- 6.50
New York, dealers	2.25- 2.50
Pittsburgh	8.75- 9.25
St. Louis	2.25- 2.75
Valleys	8.25- 8.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	6.00- 6.50
Cincinnati, dealers	4.00- 4.50
Cleveland	6.00- 6.50
Detroit	4.75- 5.25
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	6.00- 6.50

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	6.00- 6.50
Chicago	5.00- 5.50
Cincinnati, dealers	4.00- 4.50
Cleveland	6.50- 7.00
Detroit	4.75- 5.25
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	2.00- 2.50

PIPE AND FLUES

Cincinnati, dealers	5.00- 5.50

RAILROAD GRATE BARS

Buffalo	7.50- 8.00
Chicago, net	6.00- 6.50
Cincinnati	4.50- 5.00
Eastern Pa.	8.50
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	4.75- 5.00
Buffalo	9.00- 9.50
Cleveland	8.00- 8.50
Detroit	7.00- 7.50
Pittsburgh	10.50-11.00

FORGE SCRAP

Boston, dealers	4.50- 4.75
Chicago, heavy	10.50-11.00
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	7.50- 8.00
Chicago, elec. fur.	9.50-10.00
Cleveland	7.00- 7.50
Eastern Pa.	9.50
St. Louis	7.00- 7.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.00-10.50
Buffalo	12.50-13.00
Chicago, net	13.50-14.00
Eastern Pa.	16.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship. point.	11.75-12.00
Eastern Pa.	17.00
New York, dealers	13.00-13.25
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	5.25- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.75-13.25
Chicago, iron	10.50-11.00
Chicago, rolled steel	11.00-11.50
Cincinnati, iron	8.50- 9.00
Eastern Pa., iron	11.00
Eastern Pa., steel	13.50
Pittsburgh, iron	12.50-13.00
Pittsburgh, steel	14.50-15.00
St. Louis, iron	7.50- 8.00
St. Louis, steel	10.00-10.50

NO. 1 CAST SCRAP

Birmingham	8.50- 9.00
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50- 8.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.75-11.25
Buffalo, mach.	10.50-11.00
Chicago, agri. net	8.00- 8.50
Chicago, auto	9.00- 9.50
Chicago, mach. net	9.50-10.00
Chicago, railr'd net	8.00- 8.50
Cinci., mach. cup	9.00- 9.50
Cleveland, cupola	11.50-12.00
Detroit, net	9.50-10.00
Eastern Pa., cupola	11.00-12.00
E. Pa., mixed yard	8.50- 9.50
Pittsburgh, cupola	12.75-13.25
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach.	9.00- 9.50

HEAVY CAST

Boston, del.	5.00- 5.25
Buffalo, break.	8.50- 9.00
Cleveland, break.	7.50- 8.00
Detroit, No. 1, mach. net	10.00-10.50
Detroit, break.	7.00- 7.50
Detroit, auto net	10.50-11.00
Eastern Pa.	10.50-11.00
N. Y., break. deal.	6.25- 6.75
Pittsburgh	11.75-12.25

MALLEABLE

Birmingham, R. R.	10.00-11.00
Boston, consum.	12.00-12.50
Buffalo	12.50-13.00
Chicago, R. R.	13.50-14.00
Cincinnati, agri. del.	8.75- 9.25
Cleveland, rail	12.00-12.50
Detroit, auto	10.00-10.50
St. Louis, R. R.	10.50-11.00
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.00
Boston, dealers	8.00- 8.50
Buffalo	10.50-11.50
Chicago	11.00-11.50
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	12.00-12.50
St. Louis, No. 1	9.00- 9.50

LOW PHOS. PUNCHINGS

Buffalo	12.50-13.00
Chicago	12.50-13.00
Eastern Pa.	13.00-14.00
Pittsburgh (heavy)	13.50-14.00
Pittsburgh (light)	13.00-13.50

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ores

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.50

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

	STEEL BARS	IRON BARS	REINFORCING BARS	SHAPES	PLATES	NO. 10 BLUE	NO. 24 BLACK	NO. 24 GALV. SHEETS	BANDS	HOOPS	COLD FIN. STEEL	COLD ROLLED STRIP	TOOL STEELS	BOLTS AND NUTS
Baltimore*	2.95c	3.40c	2.60c	3.00c	3.00c	3.10c	3.60c	4.30c	3.20c	2.30c	3.58c		(Applying on or east of Mississippi river; west of Mississippi 1c up)	(100 pounds or over)
Boston††	3.00c	Chattanooga 3.31c	Chattanooga 3.31c	Boston†† 3.20c	Boston†† 3.21c	Boston†† 3.30c	Boston (g) 3.95c	Buffalo 4.00c	Boston†† 3.30c	Baltimore 2.30c	Boston 3.75c-3.90c			Discount
Buffalo	3.00c	Baltimore* 3.05c	Chicago 2.60c-2.70c	Buffalo 3.25c	Buffalo 3.37c	Buffalo 3.62c	Buffalo 3.25c	Boston (g) 4.65c	Buffalo 3.42c	Boston 4.30c	Buffalo (h) 3.40c		Base	Chicago (a) 70
Chattanooga	3.31c	Chicago 2.75c	Cincinnati 2.70c	Chattanooga 3.56c	Chattanooga 3.56c	Chattanooga 3.36c	Chattanooga 4.21c	Chattanooga 4.86c	Chattanooga 3.61c	Buffalo 3.42c	Chattanooga* 3.98c		High speed 57c	Cleveland 70
Chicago	2.95c	Cincinnati 3.17c	Houston 3.25c	Chicago 3.20c	Chicago 3.20c	Chicago 3.05c	Chicago 3.85c	Chicago (h) 4.55c	Ch'cago 3.30c	Chicago 3.30c	Chicago (h) 3.35c		High carbon, high chrome 37c	Detroit 70–5
Cincinnati	3.17c	New York‡(d) 3.36c	Los Ang., cl. 2.45c	Cincinnati 3.42c	Cincinnati 3.42c	Cincinnati 3.22c	Cincinnati 4.07c	Cincinnati 4.72c	Cincinnati 3.47c	Chicago 3.30c	Cincinnati 3.57c		Oil hardening 22c	Milwaukee 70
Cleveland	2.95c	Philadelphia* 2.93c	New Orleans 3.50c	Cleveland 3.31c	Cleveland, ¼-in. and over 3.31c	Cleveland 3.11c	Cleveland 3.91c	Cleveland 4.61c	Cleveland 3.36c	Cincinnati 3.42c	Cleveland (h) 3.35c		Special tool 20c	Pittsburgh 70
Detroit	3.04c	St. Louis 3.19c	Pitts., plain (h) 3.05c	Detroit 3.42c	Detroit 3.42c	Det., 8-10 ga. 3.14c	Detroit 3.94c	Detroit 4.72c	Det., ¾-in. and lighter 3.39c	Cleveland 3.31c	Detroit 3.49c		Extra tool 17c	
Houston	3.00c	St. Paul 3.00c	Pitts., twisted squares (h) 3.175c	Detroit, ⅜-in. 3.65 c	Detroit, ⅜-in. 3.65 c	Houston 3.35c	Los Angeles 4.35c	Houston 4.40c	Houston 3.25c	Detroit 3.36c	Los. Ang.(f) (d) 5.70c		Regular tool 14c	
Los Angeles	3.60c	Tulsa 3.25c	San Francisco 2.45c	Houston 3.00c	Houston 3.00c	Los Angeles 3.70c	Milwaukee 3.96c	Los Angeles 4.95c	Los Angeles 4.10c	Houston 3.25c	Milwaukee 3.46c		Uniform extras apply	
Milwaukee	3.06c		Seattle 2.45c	Los Angeles 3.60c	Los Angeles 3.60c		New York 3.89c	Milwaukee 4.66c	Milwaukee 3.41c	Los Angeles 4.10c	New Orleans 4.15c			
New Orleans	3.30c		St. Louis 3.24c	Milwaukee 3.31c	Milwaukee 3.31c		Philadelphia*† 3.60c	New Orleans 4.50c	New Orleans 3.95c	Milwaukee 3.41c	New York 3.81c-4.31c			
New York‡(d)	3.26c		Tulsa 3.25c	New Orleans 3.55c	New Orleans 3.55c		Pitts.** (h) 3.55c	New York 4.50c	New York(d) 3.56c	New Orleans 3.56c	Philadelphia 3.61c			
Pittsburgh (h)	2.90c		Young. 2.30c-2.60c	New York(d) 3.40c	New York(d) 3.40c		Portland 4.40c	Philadelphia*† 4.30c	Philadelphia 3.18c	New York 3.31c	Pittsburgh 3.20c			
Philadelphia*	2.93c			Philadelphia* 2.98c	Philadelphia* 2.98c		San Francisco 4.40c	Pitts** (h) 4.15-4.45c	Pittsburgh(h) 3.20c	Philadelphia 3.45c	Portland (f) 5.85c			
San Francisco	3.60c			Phila. floor 4.95c	Phila. floor 4.95c		Seattle 4.40c	Portland 5.00c	Portland 4.25c	Pittsburgh(h) 3.70c	San Fran.(f) (d) 5.80c			
Seattle	3.60c			Pittsburgh(h) 3.15c	Pittsburgh(h) 3.15c		St. Louis 4.09c	San Francisco 5.00c	San Francisco 4.25c	Portland 5.60c	Seattle (f) (d) 5.85c			
St. Louis	3.19c			Portland 3.55c	Portland 3.55c		St. Paul 3.695c	Seattle 5.00c	Seattle 4.25c	San Francisco 6.15c	St. Louis 3.59c			
St. Paul	3.00c			San Francisco 3.55c	San Francisco 3.55c		Tulsa 4.75c	St. Louis 4.79c	St. Louis 3.54c	Seattle 5.60c	St. Paul 3.05c			
Tulsa	3.25c			Seattle 3.55c	Seattle 3.55c			St. Paul 4.19c	St. Paul 3.20c	St. Louis 5.60c	Tulsa 4.50c			
				St. Louis 3.44c	St. Louis 3.44c			Tulsa 5.10c	Tulsa 3.45c	St. Paul 3.75c				
				St. Paul 3.25c	St. Paul 3.25c									
				Tulsa 3.50c	Tulsa 3.50c									

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 23

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.41 3 2 6	$13.83	1 14 0
Basic bessemer	15.41 3 2 6*	13.01	1 12 0
Hematite, Phos. .03-.05	15.53 3 3 0	.....	.....
SEMIFINISHED STEEL			
Billets	$27.12 5 10 0	$19.12	2 7 0
Wire rods, No. 5 gage	41.91 8 10 0	36.61	4 10 0
FINISHED STEEL			
Standard rails	$38.21 7 15 0	$44.74	5 10 0
Merchant bars	1.65c 7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.62c 7 7 6	1.14c	3 1 6
Plates, †¼ in. or 5 mm.	1.76c 8 0 0	1.52c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.04c 9 5 0	2.14c	5 16 0††
Sheets, gal., 24 gage, corr.	2.48c 11 5 0	3.31c	9 0 0
Bands and strips	1.87c 8 10 0	1.47c	4 0 0
Plain wire, base	2.04c 9 5 0	1.97c	5 7 6
Galvanized wire, base	2.37c 10 15 0	2.30c to 2.34c	6 5 6 to 6 7 6
Wire nails, base	2.64c 12 0 0	2.12c	5 15 0
Tin plate, box 108 lbs.	$ 4.44 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.64 3 7 6(a)	$17.13	260	$12.51	370	$25.36	63
Basic bessemer pig iron	16.64 3 7 6(a)*	12.19	185	11.15	330	27.97 (b)	69.50
Furnace coke	4.07 0 16 6	7.91	120	3.72	110	7.65	19
Billets	27.12 5 10 0	28.34	430	18.31	540	38.84	96.50
Standard rails	1.82c 8 5 0	2.08c	694	1.65c	1,100	2.40c	132
Merchant bars	1.89c 8 12 0	1.68c	560	.90c	600	2.00c	110
Structural shapes	1.93c 8 15 0	1.65c	550	.90c	600	1.96c	107.50
Plates, †¼-in. or 5 mm.	1.99c 9 1 3	2.10c	700	1.13c	750	2.31c	127
Sheets, black	2.31c 10 10 0§	2.55c	850‡	1.24c	825‡	2.62c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.86c 13 0 0	4.06c	1,350	2.25c	1,500	6.73c	370
Plain wire	2.04c 9 5 0	3.39c	1,130	1.65c	1,100	3.15c	173
Bands and strips	2.06c 9 7 0	1.95c	650	1.26c	840	2.31c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 67 per cent over paper sterling.

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Bars

Bar Prices, Page 70

Pittsburgh—Soft steel bars have been reaffirmed for third quarter at 1.80c, Pittsburgh, and at 2.45c, base, for alloy steel bars. There will be no change in bar extras. Farm implement manufacturers are still prominent in the bar market, but buying from automotive concerns is less. The latter condition has affected not only material for direct shipment to the automotive assembly plants, but to cold-drawn bar finishers and numerous parts manufacturers.

Cleveland—For the second consecutive week, steel bar specifications have declined, especially noticeable in automobile and implement manufacturing requirements. Sellers believe this is a temporary situation growing out of labor uncertainties, extension of prices for third quarter and the possibility of an open market after June 16. Settlement of some strikes, affecting bar requirements, has been followed by strikes at other plants in this district. The net result has been that out of 30 orders received by one seller during the week, the average was 12 tons. Additional buying in substantial volume for June is expected from automobile manufacturers.

Chicago—Steel bar demand shows only minor fluctuations. Better automotive releases result largely from increased operations at some points where strikes had interrupted schedules previously. Tractor manufacturers continue to run near capacity and backlogs indicate heavy operations until September at least. Miscellaneous consumers account for a steady volume of sales and specifications. Buying in practically all cases is for early needs and due to uncertainty regarding the steel code extension, third quarter contracting is expected to be moderate until at least after June 16.

Boston—Commercial steel bar buying is light. Reaffirming of prices for next quarter was generally expected, and 2.22c, Boston, will continue in effect. With limited stocks, consumers are taking shipments close to immediate requirements, but are covering for next quarter.

New York—Steel importers are beginning to feel the pinch of the federal regulation barring use of foreign steel on PWA work. Commercial bar prices are steady, with demand slow.

Youngstown, O.—The feature of the steel bar market is the satisfactory shipments of alloy bars specified by auto partsmakers. However, common steel bar users are accepting shipments in fair volume for widely diversified lines of manufacture. This is leading to bar mill operations on about 35 to 45 per cent of capacity.

Plates

Plate Prices, Page 70

Pittsburgh — The 1.80c, Pittsburgh, base on plates has been extended for third quarter. On bids received May 20 at Pittsburgh, Treadwell Construction Co., Midland, Pa., is low at $78,000, f.o.b. Park View Station, W. Va., on six large steel conduits, mainly ¾-inch steel plates, for the Tygart river reservoir dam near Grafton, W. Va. Bids were taken last week by Gulf Refining Co., Pittsburgh, for two steel tank barges, each of 3000-barrel capacity, requiring about 275 tons of steel plates. Socony-Vacuum Oil Co., New York, is in the market for four steel cargo barges, and inquiry should be out within two weeks by the American Oil Co., Baltimore, for seven vertical steel tanks it will build at Hays, Pa., and six to eight all-welded steel tank barges.

Cleveland—Small orders for plates are fairly numerous, and the Cleveland mill accumulates sufficient tonnage for some schedules in alternate weeks. Builders of road machinery and small boiler shops are active.

Chicago — Plate demand is principally from miscellaneous consumers. Moderately heavier releases have been received from structural fabricators. Additional plate business for lock and dam construction on the Mississippi river is in prospect, since funds have been appropriated for the building of five more units.

Boston—Plate business continues slow. Shipyards with government contracts are taking shipments steadily. Demand for oil storage and distribution is slack.

New York—Norfolk County Ferry Co., Norfolk, Va., is asking bids on a ferryboat, requiring about 400 tons of plates, shapes and bars. Specifications are being released by the Sun Shipbuilding Co., Chester, Pa., on 300 tons of plates for the Erie ferryboat, most of which will be supplied by a Pittsburgh mill, it is reported. Shipments are still suspended to plants of the New York Ship Building Co., pending adjustment of the strike.

San Francisco—Plate demand is retarded by a lull in heavy government construction work and awards are limited to lots of less than 100 tons. No action has yet been taken on 1600 tons for the Eureka, Calif., pipe line. Bids open in San Francisco, this week, on about 400 tons for a 20 and 28-inch welded pipe line for the national park service near Mammoth Hot Springs in Wyoming. No date for bids has been set for 1850 tons of penstock for San Gabriel dam No. 1, Los Angeles.

Seattle—Demand is only fair but new projects are developing. Bids were opened at Kansas City, Mo., this week for 550 tons for land pipe for the Fort Peck, Mont., project, McClintic-Marshall Corp., Bethlehem, Pa., is low at $41,096, but award is pending while delivered costs are ascertained. Seattle will open bids June 6 for the Ballard trunk sewer calling for a siphon, 2500 feet long, requiring 250 tons of ½-inch welded steel.

Contracts Placed

300 tons, 57 pieces of 52-foot pontoon pipe, 32 inches in diameter, and 125 sections of shore pipe, 13 feet long and 32-foot diameter, ½-inch plates, for Memphis, Tenn., army engineers, to Treadwell Construction Co., Midland, Pa., on low bid of $127,000.

Contracts Pending

2500 tons, 27-inch welded steel pipe lines, water system, Fort Smith, Ark.; bids June 17.

1800 tons, plates and structural shapes, tunnel conduit linings, six large steel conduits for Tygart, W. Va., dam near Grafton, W. Va.; Treadwell Construction Co., Midland, Pa., low at $78,000, f.o.b. Park View Station, W. Va.

550 tons, 24 and 28-inch land pipe, Fort Peck, Mont., dam; McClintic-Marshall Corp., Bethlehem, Pa., low.

375 tons, 20 to 28-inch welded pipe for national park service near Mammoth Hot Springs, Wyo.; bids at San Francisco, May 24.

270 tons, two steel tank barges, each with 3000-barrel capacity, for Gulf Refining Co., Pittsburgh.

250 tons, Ballard trunk sewer project, Seattle, alternate creosoted stave pipe; bids June 6.

200 tons, 300,000-gallon tank on 110-foot tower and 200,000-gallon tank on 118-foot tower, Guthrie, Okla.; bids May 29.

Sheets

Sheet Prices, Page 70

Pittsburgh — No. 20 gage cold-rolled sheets have been reaffirmed at 2.95c, Pittsburgh, for third quarter, as have No. 10 gage cold-rolled sheets at 2.50c, Pittsburgh. Prices on No. 10 gage hot-rolled sheets at 1.85c, Pittsburgh, and on No. 24 hot rolled annealed at 2.40c, Pittsburgh, also have been extended; galvanized at 3.10c, base. Despite the fact automotive labor troubles have cleared, there is no marked resumption of full-finished sheet buying. Operations in that branch of the industry advanced only slightly last week to 55 per cent. Common black sheet production remains steady at 60-62 per cent, although galvanized sheet out-

put is up a few points to 52 per cent. Buying of sheets for farm culverts, troughs, and eaves is active, and makers of small household water tanks are increasing specifications.

Cleveland—Sheet tonnage from automobile manufacturers has not developed the volume expected following the settlement of Chevrolet and Fisher Body strikes. There are indications demand from these sources has passed the peak for the present, although considerable buying is expected for June. The Cleveland sheet mill last week continued at 50 per cent, with reduced backlogs. Although the strike at Newton Steel Co.'s Monroe, Mich., sheet mill was settled two weeks ago, the company had not accumulated sufficient tonnage to resume last week, while continuing shipments from stock. Specifications from refrigerator manufacturers have declined, as customary at this period, but demand from makers of washing machines and other household utilities is well sustained. Sheet prices have been extended for third quarter.

Chicago—Heavier automotive releases tend to offset the declining tendency which appeared in sheet demand recently. While some hesitation is noted in sheet consumption as a whole, orders the past week showed little change from those of the preceding two weeks. Production is fairly steady, with orders generally adjusted closely to early needs of consumers. Forward buying is expected to continue light for at least another 30 days.

Boston—Sheet buying is steadier, and some sellers note a slight improvement. Continued substantial operations by one large producer of refrigerators is encouraging. Industrial consumers frequently ask for quick shipment on carload orders. Jobbers' stocks are light.

New York—While miscellaneous demand is steady, requirements of some of the larger consuming industries, such as electric refrigerators, are tapering. Total volume is down. Prices have been reaffirmed for third quarter.

Philadelphia — Sheet tonnage is fair, although lighter than a month ago. Prices have been extended for third quarter.

Buffalo — Buffalo district sheet mills are operating at 70 to 75 per cent. Demand has shown little change.

Youngstown, O.—Demand for steel sheets indicates sustained mill operations are expected to continue for at least another month. The slight tapering off in demand a fortnight ago from various automotive consumers, including partsmakers, due to spasmodic strikes, has been halted and again the volume of specifications is turning upward. Although barrelmakers are not taking the sheet tonnage that they formerly did, this is expected to increase later. More sheet tonnage right now is going to miscellaneous lines of manufacture than at any previous period so far this year.

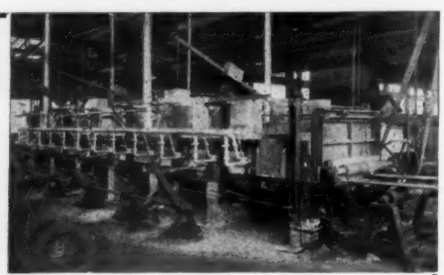
Cincinnati — Specifications for sheets from the automotive industry and some household equipment lines show moderate shrinkage. Demand for galvanized is brisk. Sheet mill rolling schedules averaging about 60 per cent are maintained in this district.

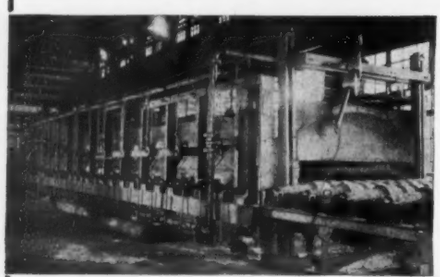
Seattle—Demand is fair, blue annealed, black and galvanized moving in about equal volume. Inquiries for repairs and replacements are more active than those for new construction.

Salem, Oreg., will open bids soon on 250,000 pairs or license tags, requiring a substantial tonnage of sheets.

INDUSTRIAL FURNACES

BURNER EQUIPMENT





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Cold Finished

Cold Finished Prices, Page 71

Pittsburgh—The market of 1.95c, Pittsburgh, on cold-finished carbon

steel bars and 2.95c, Pittsburgh, on cold-finished alloy steel bars, has been reaffirmed for third quarter. The Gary, Ind., and Cleveland base of 2.00c, Buffalo 2.05c, Detroit 2.15c and Eastern Michigan 2.20c on carbon cold-finished steel are also extended. The market reflects a cautious buying policy by automobile manufacturers and orders from these sources have been off so far in May. However, miscellaneous consumption holds up well and includes attractive orders from farm implement manufacturers.

New York—Cold finished steel bars, one of the few products about which there appeared a possibility of an advance, have been reaffirmed as to price for third quarter.

Pipe

Pipe Prices, Page 71

Pittsburgh—Current discounts on all grades of standard, seamless and line pipe, and boiler tubes have been extended for the third quarter. Demand, still led by oil country goods, is sufficient to maintain district rate of operations close to 45 per cent. Bids will be asked by the Tennessee valley authority, Knoxville, Tenn., on 3900 feet of 2 to 12-inch pipe for the Pickwick lock in the Tennessee river, 200 miles above Paducah, Ky. United States Pipe & Foundry Co. is preparing to dismantle its plant at Scottdale, Pa., near here.

Cleveland—The market is quiet, with only small lots of cast pipe moving to public works projects. For Cleveland's easterly sewage disposal plant, 200 tons of cast pipe is expected to be formally awarded shortly, government funds having been assured.

Chicago—New business in cast iron pipe is insufficient to add to producers' backlogs and total activity lacks improvement compared with conditions a year ago. Additional orders are expected to result through the work relief spending program, though considerable of this will be delayed

Boston—Following the closing on most pending cast iron pipe inquiries, from 1500 to 2000 tons, including small orders, demand has slumped. A fair volume of pipe will be required, however, when funds are released under the public works program. Smithfield, R. I., will readvertise for 1200 tons. Merchant steel pipe buying is steady, but not heavy.

Youngstown, O.—Jobbers are buying merchant pipe to fill in depleted stocks. Line pipe for oil and gas fields is being placed from time to time in slightly larger tonnages. Local pipe mills are operating at 40 to 45 per cent.

Seattle—Inquiry has improved slightly but new projects are developing slowly.

San Francisco—The cast iron pipe market is now the most active one on the Pacific coast. The largest award of the year, just placed, involved 5150 tons of 6 to 12-inch pipe for Los Angeles. United States Pipe & Foundry Co. took 3700 tons, American Cast Iron Pipe Co. 750 tons, and National Cast Iron Pipe Co. 700 tons. Bids have been taken on a number of new inquiries in Utah and Montana, calling for over 800 tons. Oakland has opened bids on 3005 tons of 4 to 20-inch pipe.

Cast Pipe Placed

5150 tons, 6 to 12-inch, Los Angeles, allocated as follows: 3700 tons to United States Pipe & Foundry Co., Burlington, N. J.; 750 tons to American Cast Iron Pipe Co., Birmingham, Ala.; and 700 tons to National Cast Iron Pipe Co., Birmingham, Ala.

1300 tons, Milwaukee, to United States Pipe & Foundry Co., Burlington, N. J.

500 tons, Marlboro, Mass., to R. D. Wood

● YOU can order these convenient bar shapes *pre-formed to your purpose*, within specified tolerances, ready for cutting to length and surfacing smooth with minimum machining in your shop.

They are available in a wide range of sizes, shapes and physical properties to meet the requirements of your product. You will find that this rapid, economical method of making intricate parts offers new opportunities for profit in manufacture.

B & L Cold Drawn Special Sections give you the advantages of high accuracy, uniform quality and easy workability. Let B & L engineers make a survey of your needs, and submit recommendations for applying this short-cut method to your operations.

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HARVEY, ILL. *Sales Offices in all Principal Cities* BUFFALO, N.Y.

& Co., Florence, N. J.
350 tons, 36-inch, Greenburgh, N. Y., to Donaldson Iron Works, Emaus, a.
300 tons, 10-inch and under, Hinsdale, N. H., to R. D. Wood & Co., Florence, N. J.
400 tons, Malden, Mass., to Warren Foundry & Pipe Co., Chelsea, Mass.
270 tons, 6 to 12-inch, Fond du Lac, Wis., to United States Pipe & Foundry Co., Burlington, N. J.
265 tons, 18 and 24-inch, Brockton, Mass., to R. D. Wood & Co., Florence, N. J.
140 tons, 8-inch, Yonkers, N. Y., to R. D. Wood & Co., Philadelphia.
100 tons, 6-inch, ublic Service Corp. of New Jersey, Jersey City, N. J., to Donaldson Iron Works, Emaus, Pa.
100 tons, Scarsdale, N. Y., to Donaldson Iron Works, Emaus, Pa.

Cast Pipe Pending

3005 tons, 4 to 20-inch, Oakland, Calif.; bids in.
1600 tons, 16-inch and under, also 30 tons of fittings, Guthrie, Okla.; bids May 29.
1255 tons, 16 to 24-inch, Milwaukee; United States Pipe & Foundry Co., Burlington, N. J., low.
328 tons, 2 to 8-inch, class 150, Fountain Green City, Utah; bids in.
311 tons, 2 to 8-inch, class 150, Parowan, Utah; bids in.
200 tons, 4-inch, class 150, Compton, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low.
175 tons, Chicago sanitary district; Tully-Costello Co., Chicago, low for general contract.
165 tons, 12-inch, also accessories, Spokane; bids in.
145 tons, 4, 6 and 8-inch, Bainville, Mont.; general contract to Huston & Mackley, Minot, N. Dak.
143 tons, Emerytown, Utah; bids in.
100 tons, 4-inch, class 150, Compton, Calif.; bids in.
Unstated tonnage, 18,000 feet of 4 to 8-inch, Crandon, Wis.; bids soon.
Unstated tonnage, 6424 feet of 4 to 6-inch, Westby, Wis.; bids in.

Steel Pipe Pending

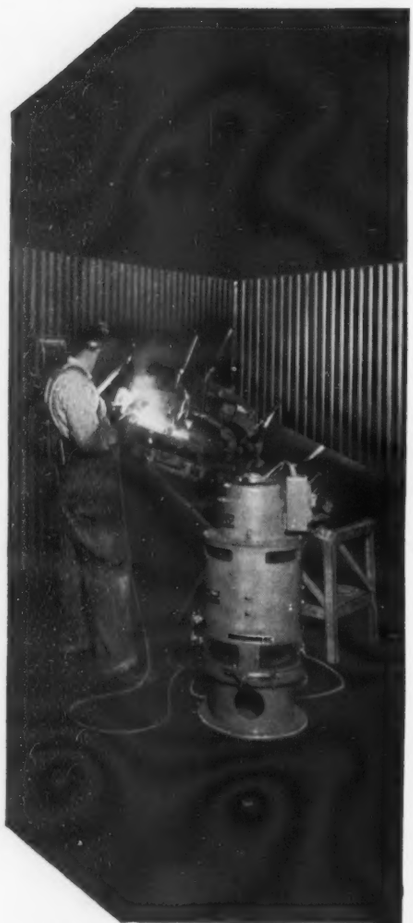
Unstated tonnage, 3900 feet of 2 to 12-inch pipe, Pickwick lock, Tennessee river, 200 miles above Paducah, Ky.; bids to Tennessee Valley authority, Knoxville, Tenn., soon.

Transportation

Track Material Prices, Page 71

Opening of bids May 28 by the board of transportation, New York, on 500 subway cars for the Eighth avenue subway is the most important market development. Court permission has been granted Pressed Steel Car Co., Pittsburgh, to bid on these cars, made necessary by the company's reorganization plans. New York Rapid Transit Co. has placed formal orders for 25 five-car articulated units, ten with St. Louis Car Co., St. Louis, and 15 with Pullman-Standard Car Mfg. Co., Chicago, confirming the tentative award previously reported.

New York, New Haven & Hartford



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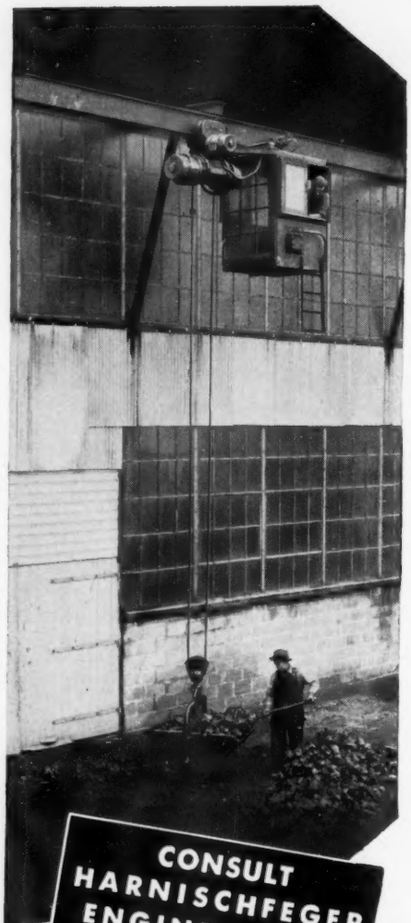
P&H HANSEN ARC WELDERS



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P&H MILWAUKEE ELECTRIC HOISTS

is considering purchase of two additional streamlined trains of five or six cars each, similar to its Comet, just completed.

Rail buying is slow, Illinois Central and Chicago, Milwaukee, St. Paul & Pacific holding back their programs. Pere Marquette has placed 1000 tons of rails with Inland Steel Co., Chicago, and divided 200 to 250 tons of splice bars between Jones & Laughlin Steel Corp., Pittsburgh, and Wheeling Steel Corp., Wheeling W. Va. Grand Trunk is inquiring for 2500 tons of tie plates. Pittsburgh & Lake Erie is said to be in the market for 900 tons of rails. City of San Francisco has awarded 235 tons of rails for its street railway to Columbia Steel Co., San Francisco.

Prices on standard steel rails have been formally extended to apply to orders received up to Sept. 1 for shipment up to Dec. 31.

Car Orders Placed

Bangor & Aroostook, two caboose cars, to its own shops at Derby, Me.

New York Rapid Transit Co., New York, 25 articulated 5-section train units formally awarded. Pullman-Standard Car & Mfg. Co., Chicago, to build 15 units and St. Louis Car Co., St. Louis, 10 units; tentative award previously noted.

Rail Orders Placed

Pere Marquette, 1000 tons, to Inland Steel Co., Chicago.

Car Orders Pending

New York, New Haven & Hartford, two five or six car trains contemplated, similar in construction to the recently completed Comet.

Locomotives Pending

Bangor & Aroostook, two heavy mountain-type freight locomotives, early inquiry expected.

Rail Orders Pending

Pittsburgh & Lake Erie, 900 tons; bids asked.

Buses Placed

American Car & Foundry Motors Co., New York: Seven 30-passenger city coaches for Capital Transit Co., Washington; nine 30-passenger city coaches for Calumet & South Chicago Railway Co., Chicago; five 29-passenger city coaches for Staten Island Coach Co. Inc., Staten Island, N. Y.; three 30-passenger city coaches for Chicago Surface Lines, Chicago; three 40-passenger city coaches for New England Transportation Co., New Haven, Conn.; ten city coaches for St. Louis Public Service Co., St. Louis; two city coaches for Boston Elevated Railway, Boston.

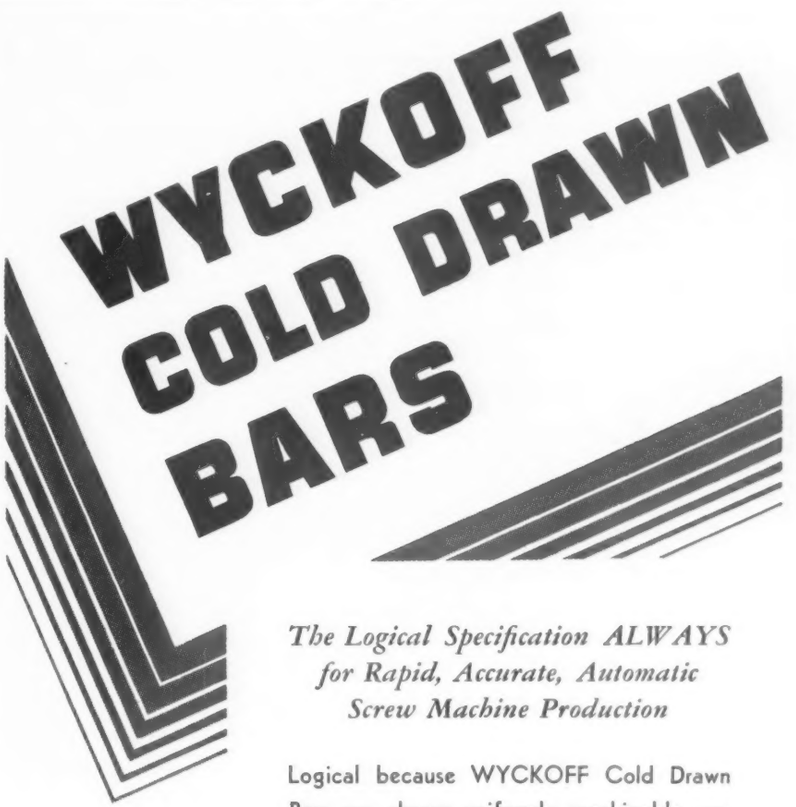
Tin Plate

Tin Plate Prices, Page 70

Pittsburgh — A loss of 10 points in tin plate mill operations has reduced the rate to 75 per cent. A leading interest dropped about 20 points to 65 per cent. Mill warehouses are well filled. In several instances the amount of stock which mills are holding is at a record peak. These tonnages have been produced against actual orders, but canmakers have not been issuing shipping instructions as fast as expected. Tin mill sizes of black sheets and No. 24 unassorted long ternes, both sold on a quarterly basis, have been reaffirmed at 2.75c and 3.40c, Pittsburgh, respectively, for third quarter. The contract price of tin plate continues $5.25 per base box.

Quicksilver

New York—Quicksilver prices are steady here and the market generally quiet. Small lots of 15 to 25 flasks are $73.50 a flask, and lots of 100 flasks or more $72 each.



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Logical because WYCKOFF Cold Drawn Bars are always uniformly machinable, unvarying in cross section and exact in size . . . every length is straight and true to your specification—with physical characteristics as constant as a laboratory formula.

Readily available in Rounds 3/16" to 6" inclusive . . . Squares 1/4 to 4" inclusive . . . Hexagons 1/4" to 3" inclusive . . . Flats 1/8" x 3/8" x 2" x 6" inclusive both in carbon and alloy grades.

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Mills at Ambridge, Pa. and Chicago: Ill.
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Shapes

Structural Shape Prices, Page 70

New York—Jones & Laughlin Steel Corp., Pittsburgh, will fabricate a large part of the 7500 tons of structural material for the Harlem river lift span crossing, Triboro bridge, the general contract being awarded to Taylor-Fichter Steel Construction Co. Inc., New York. Direct steel bids were taken on this project and the low bidder at $1,313,668 was only $2434 under the second low bid by Harris Structural Steel Co. Itemized bids will be found on page 86, this issue of STEEL. Pending structural volume is slightly heavier with projects planned which ultimately will take close to 40,000 tons.

Pittsburgh—Price of plain structural shapes has been extended for the third quarter at 1.80c, base, Pittsburgh. Bids are to be taken June 4 on the first two of nine public works projects for Allegheny county, Pittsburgh. The first two planned will involve construction of the Liberty tubes plaza and the Homestead high-level bridge substructure. It is estimated that upward of 30,000 tons of structural shapes ultimately will be required for the work. Last week Greer Steel Co., Dover, O., took bids on a 700-ton plant building for Anderson, Ind.

Cleveland—Construction work is taking only small tonnages. For Cleveland's easterly sewage treatment plant, 305 tons of shapes have been finally awarded to Fort Pitt Bridge Works, Pittsburgh, and Wheeling & Lake Erie railroad has placed 500 tons of steel piling for a dock extension at Huron, O. Western Automatic Screw Co., Elyria, O., which recently took bids on 450 tons for a building has revised its plans and will take new bids on a structure requiring 150 tons. Considerable truck-load business is reported by fabricators.

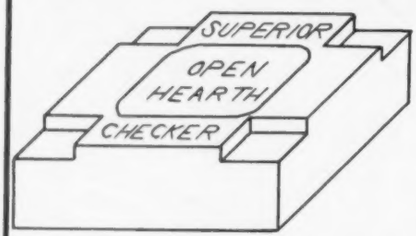
Chicago—The government has appropriated $25,000,000 of the work relief fund for the building of five additional locks and dams on the Mississippi river. Plans for several of these already have been prepared and the work is expected to start shortly though requests for bids on materials have yet to be made. Awards recently have been small, while inquiries generally lack improvement. Largest of new inquiries is 1900 tons for a medical center building in New Orleans.

Boston—Preliminary estimate of steel requirements for the Passamaquoddy bay tidal power project, Eastport, Me., is 6500 tons, according to Major Philip B. Fleming, United States engineer who will be in charge of the work. Included in this will be a considerable volume of steel sheet piling as a large cofferdam will be built, also a powerhouse and other structures. Structural awards are small.

Philadelphia — Although shape prices are being extended for third quarter, fabricated prices still are irregular. Consolidated Engineering Co., Baltimore, is low bidder for the Library of Congress addition, Washington, requiring 9000 tons of shapes.

Birmingham, Ala. — Virginia

Opportunity Knocks Again for the Steel Manufacturer . .



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Maximum free downward area per horizontal checker area;
20% to 40% more heating surface per cubic foot than obtainable with various sizes of standard shapes as usually laid-up;
Reasonable cost.

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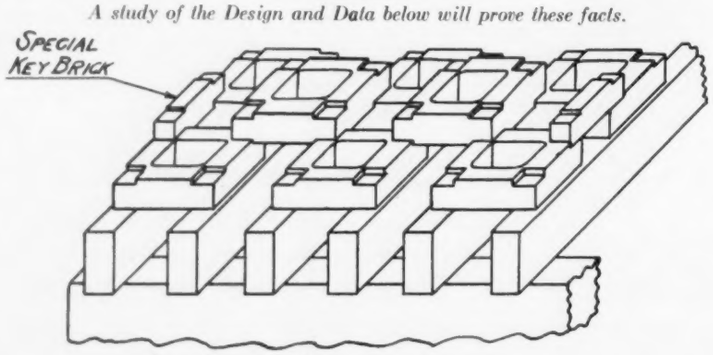

Size of Flue	5" x 5"		5½" x 5½"		6" x 6"		6½" x 6½"	
Thickness of Checker Brick	3"	2½"	3"	2½"	3"	2½"	3"	2½"
Number of Bricks per Cubic Foot	3.43	4.29	2.81	3.51	2.56	3.20	2.16	2.55
9" Equivalents per Brick	1.80	1.49	2.23	1.84	2.23	1.84	2.68	2.23
9" Equivalents per Cubic Foot	6.18	6.40	6.27	6.46	5.70	5.88	5.80	5.68
Weight per Brick—Pounds	13.50	11.18	16.73	13.80	16.73	13.80	20.10	16.73
Weight per Cubic Foot—Pounds	46.4	48.0	47.0	48.4	42.8	44.1	43.5	42.6
Free Downward Area per Horizontal Checker Area—Per Cent	49.3	48.9	48.5	48.5	52.7	52.5	51.9	52.2
Free Side or End Area Per Side or End Checker Area—Per Cent (Same for all four sides of flue)	28.2	26.4	28.0	26.3	29.2	27.4	29.1	29.9
Effective Heating Surface per Cubic Foot—(Square Foot)	5.59	6.15	5.25	5.82	4.93	5.56	4.78	5.09

William M. Bailey Company
Magee Building *Engineers* **Pittsburgh, Pa.**

Shape Awards Compared

	Tons
Week ended May 25	15,356
Week ended May 18	12,907
Week ended May 11	7,625
This week in 1934	14,285
Weekly average, 1934	16,284
Weekly average, 1935	14,997
Weekly average, April	15,412
Total to date, 1934	382,123
Total to date, 1935	314,932

Bridge & Iron Co., Roanoke, Va., on June 10 will begin shipping 2000 tons of copper-alloy steel for a bridge over Yaquina bay, Lincoln county, Oregon. Two 350-foot arches and one 600-foot arch will be erected.

San Francisco—Structural awards were the largest of any week this year, totaling 6889 tons, and included 2800 tons for the Key System-Southern Pacific track crossing, Oakland, Calif., booked by Ingalls Iron Works Co., Birmingham, Ala. Several new inquiries of importance have come out for figures and more than 18,000 tons now are pending.

Seattle — This branch of the industry is the most active of all in the Pacific northwest, new projects developing larger tonnages. Morel Foundry Co. is fabricating 50 tons for a steel and cork building to be shipped ready for assembly to Nome, Alaska, for the Merchants & Miners bank. This type of building was described in STEEL, Nov. 19, 1934. Pacific Coast Steel Corp. submitted the low bid for two 168-foot riveted truss spans for the Bonneville, Oreg., project, requiring 455 tons.

Sault Ste. Marie, Ont.—Algoma Steel Corp., here has received an order for 800 tons of steel piling, the first for this material to be placed with a Canadian firm. The company is diversifying its output, and also will manufacture mining machinery.

Shape Contracts Placed

7500 tons, Harlem river lift span crossing, Triboro bridge, New York, to Taylor-Fichter Steel Construction Co. Inc., New York. Unit bids on this project, page 86.

2800 tons, Southern Pacific-Key System crossing, Oakland, Calif., to Ingalls Iron Works Co., Birmingham, Ala.

640 tons, press shop addition, Pontiac, Mich., for Fisher Body Corp., to Jones & Laughlin Steel Corp., Pittsburgh.

500 tons, piling, Wheeling & Lake Erie railroad dock extension at Huron, O.; 300 tons to Carnegie Steel Co., Pittsburgh; and 100 tons each to Bethlehem Steel Co., Bethlehem, Pa., and Jones & Laughlin Steel Corp., Pittsburgh.

500 tons, mail conveyors, Pennsylvania railroad station, New York, to the Lamson Co. Inc., Syracuse, N. Y.

430 tons, cold finishing mill building, Dearborn, Mich., for Ford Motor Co., to McClintic-Marshall Corp., Bethlehem, Pa.

375 tons, dormitory, Smith college, Northampton, Mass., to Haarmann Steel Co., Holyoke, Mass., E. J. Pinney Inc., Springfield, Mass., general contractor.

305 tons, easterly sewage treatment plant, Cleveland, to Fort Pitt Bridge Works, Pittsburgh; through Hunkin-Conkey Construction Co., Cleveland.

260 tons, state bridge NRH 327-A, Sabine county, Texas, to Virginia Bridge & Iron Co., Roanoke, Va.

225 tons, Montgomery Ward & Co., building, Sacramento, Calif., to Golden Gate Iron Works, San Francisco.

200 tons, building, American Radiator Co., Buffalo, to Rogers Structural Steel Co., Corry, Pa.

150 tons, state highway bridge, Sioux Falls, S. Dak., to McClintic-Marshall Corp., Bethlehem, Pa.

150 tons, state highway bridge, Nada, Ky., to Midland Structural Steel Co., Chicago.

150 tons, building for Carborundum Co., Niagara Falls, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

150 tons, sewage pumping plant, Blue Plains, Washington, to Ingalls Iron Works Co., Birmingham, Ala.; through Suburban Engineering Co., New York.

150 tons, two college buildings at Loma Linda, Calif., and high school at Long Beach, Calif., to Consolidated Steel Corp., Los Angeles.

136 tons, 86 tons shapes and 50 tons bars, cold storage service building, state prison, Auburn, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa., and Taylor, Davis Co., Philadelphia; W. E. Wark Co., Philadelphia, general contractor.

115 tons, three 60-foot I-beam spans, Lancaster county, Nebraska, to St. Joseph Structural Steel Co., St. Joseph, Mo.

110 tons, Mott Haven Health center, Bronx, N. Y., to Berkshire Structural Steel Co., Brooklyn, N. Y.

110 tons, two gymnasiums for high school, Huntington Park, Calif., to Western Iron & Metal Co., Los Angeles.

100 tons, tunnel ribs, metropolitan water district, Los Angeles, to Commercial Shearing & Stamping Co.,

SAVE UP TO 50% ON HEAT TREATING BY FORCED CONVECTION

Profit-wise users throughout the country are cashing in on the outstanding advantages possessed by Morrison Forced Convection Heating Equipment. Through radical improvements in principle and design, such opportunities as these are yours—As much as six times the speed of former methods in bringing charge up to full heat—Absolute uniformity of heat and accuracy of adjustment—Controlled atmosphere through manipulation of only one burner—Great fuel economy through recirculation of air and low furnace absorption. These features, and more, are tangible profit makers. Investigate what Morrison Engineered Equipment can offer you.

Other Morrison Engineered Equipment consists of Paint, Foundry, Ceramic, and Lithographing Ovens; Tank and Process Heating installations; all utilizing the principle of Forced Convection and operating at temperatures up to 1400°F.

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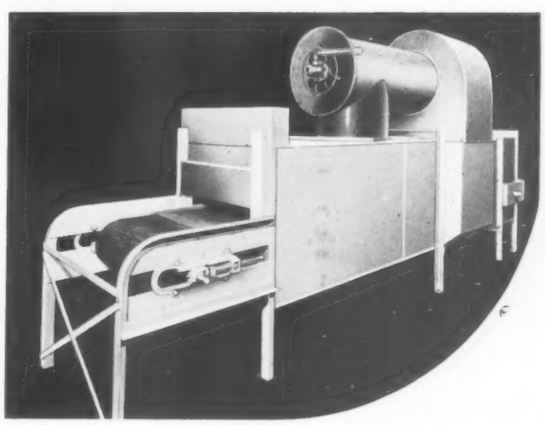

Gas fired, continuous heat treating furnace, embodying the Forced Convection heating principle as individually engineered for every job by Morrison experts.

Los Angeles.

100 tons, state highway work in Mendocino and Los Angeles counties, California, to unnamed interest.

100 tons, shapes and bars, bridge, Gilsum, N. H., to McClintic-Marshall Corp., Bethlehem, Pa.

100 tons, warehouse, E. F. Houghton Co., Corp., Bethlehem, Pa.

Shape Contracts Pending

9000 tons, addition to Library of Congress, Washington; Consolidated Engineering Co., Baltimore, low for general contract.

8600 tons, Missouri river bridge, St. Charles, Mo., for Charles Bridge Co., St. Charles.

6000 tons, superstructure, Henry Hudson bridge, Spuyten Duyvil, N. Y.; bids June 14, to Henry Hudson bridge authority, New York.

2000 tons, Westchester county home, Eastview, N. Y.; William L. Crow Co., low, but over appropriation.

1900 tons, medical center building, New Orleans.

1350 tons, Pickwick lock, Tennessee river, 200 miles above Paducah, Ky.; lock to be 110 feet wide, 600 feet long, and 66-foot lift; bids to Tennessee valley authority, Knoxville, Tenn., soon.

825 tons, cranes, Great Lakes Steel Corp., Ecorse, Mich.

800 tons, school, Olean, N. Y.; John W. Cowper Co., Buffalo, low.

750 tons, outfall sewer, Los Angeles county, California; bids July 2.

700 tons, mill building, Anderson, Ind., for Greer Steel Co., Dover, O.; bids received.

700 tons, state bridge, Blodgett, Ill.; bids May 29.

700 tons, custom house addition, Denver.

575 tons, New York Central, railroad station, Syracuse, N. Y.; bids in.

500 tons, building, Cincinnati, for F. W. Woolworth Co., New York.

500 tons, Allegheny county home for mental defectives, Mayview, Pa.; William S. Miller Co., Pittsburgh, low on general contract.

455 tons, two 168-foot riveted steel trusses, Bonneville, Oreg., dam project; Pacific Coast Steel Corp., San Francisco, low.

450 tons, plant, Liquid Carbonic Co., Chicago.

369 tons, state bridge, New river, Pulaski county, Virginia, 269 tons to be furnished by state; bids May 29.

300 tons, bottle warehouse, Kearns-Gorsuch Co., Zanesville, O., division of Libby Owens Glass Co.; bids indefinitely postponed.

250 tons, museum, Tryon park, New York.

250 tons, building, Sisters of Mercy, New Britain, Conn.

250 tons, bulk oil station, Hays, Pa., for American Oil Co., Baltimore.

200 tons, state bridge, Gurnee, Ill.; bids May 29.

184 to 240 tons, Honker Cut bridge, San Joaquin county, California; bids June 3.

180 tons, trashrack frames, bars, screens, and grilled doors, Tygart river reservoir dam, Grafton, W. Va.; Spuck Iron & Foundry Co., St. Louis, low at $24,267 on May 22; bids to Pittsburgh army engineers.

156 tons, piling, schedule 1099, 12th naval district, San Francisco; used material fabrication placed with Pacific Coast Steel Corp., San Francisco.

150 tons, building, Western Automatic Screw Co., Elyria, O.; plans revised from 450-ton structure; new bids being taken.

150 tons, administration building, easterly sewage treatment plant, Cleveland; bids being taken. Project also requires 270 tons of concrete bars.

125 tons, Pershing road bridge, Chicago; bids May 29.

Unstated, steel truss span, Flathead river, Mont.; Portland Bridge Co., Portland, Oreg., low.

Unstated, office and equipment building for Pacific Telephone & Telegraph Co., Walla Walla, Wash.; bids soon.

Unstated tonnage, five Misisippi river locks and dams; federal appropriation made.

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We have for sale desirable Blast Furnace Equipment, salvaged from The Stewart Furnace Company plant at Sharon, Pa.

TRESTLE AND STOCKHOUSE

Of all steel construction. This unit has seen very little service, being installed just prior to the shut-down of this plant. Stringers are of 28″ x 10″ Bethlehem Girder Beams. The stock house is equipped with Brown Hoist hoppers, gates and larry cars.

There are also many pieces of stove and furnace auxiliary equipment that may be used to advantage as spares in your furnace plant.

You are urged to inspect this equipment at Sharon, Pa. at your earliest convenience.

We also have at Niles, additional steel mill equipment as follows:

3	13′0″ Woodward Sheet Shears, original price $6500.00. Sale price	$1600.00
2	13′10″ United Sheet Shears, original price $5800.00 Sale price	$1600.00
1	13′0″ Hyde Park Shear, original price $4200.00 Sale price	$1600.00

All shears have long and short gauge arms and are equipped with 60 cycle, 3 phase, 220 volt G.E. Motors, 900 RPM.

1	Railroad Track Scale	$500.00
6	Trays Edison Batteries for Elwell-Parker Trucks, each	50.00
1	D.C. Charging Panel for above Batteries	100.00
	A good supply of spare Shear blades for 10′ and 13′ shears.	

Above prices are net, F.O.B. cars Niles, Ohio

2 Hot Mill Drives—described as follows: 1 G.E. Motor Type M I 24—1200—300 Form A 60 Cycle 305 Amps 1200 HP 2300 Volts No. 4227088—295 RPM complete with control—2 Falk Gear Drives HP 20-30 Type S-20 1200 HP No. 9270—295 to 29.8 RPM—2 13-ft. Fly Wheels on above Drives.

Motor & Control $6500.00. Gear $6500.00. Both $12,000.00 F.o.b. cars, Mansfield.

HETZ CONSTRUCTION CO.

Salvage Dept. **NILES, OHIO** **Phone 1203**

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 71

Bolt and nut prices have been reaffirmed for third quarter at 70-10-5 off. Rivet prices have also been reaffirmed unchanged, at 2.90c, Pittsburg and Cleveland and 3.00c, Chicago, for large rivets and 70-5 off list for small.

All shipments recently suspended by Chevrolet and Fisher Body have now been released, but a strike at the White Motor Co., Cleveland, has caused suspension of shipments to that plant.

Reinforcing

Reinforcing Bar Prices, Page 71

New York—New reinforcing steel inquiry is light, about 3000 tons being active in the district, including 1700 tons for a grade crossing, Staten Island, N. Y., on which bids are in. Highway and bridge work under the public work allotments is not expected to get under way much before July. Low bid on a small tonnage of bars in place in connection with the Harlem river lift bridge was 0.0337c per pound.

Pittsburgh — New billet steel bars in cut lengths, carload quantities, have been reaffirmed at 2.05c, base, Pittsburgh, for third quarter. State of West Virginia was recently allotted $9,000,000, and the state of Pennsylvania over $20,000,000 federal funds for highway and railroad separation work, which will require a large tonnage of reinforcing steel. Bids will be taken June 4 by the Allegheny county authority, Pittsburgh, for the first of its $24,500,000 public works program in construction of the Liberty tubes plaza and the Homestead high-level bridge substructure.

Cleveland—Demand for reinforcing bars is restricted to a few public works projects, and tonnages are small. After several months delay, government money has been obtained for Cleveland's easterly sewage treatment plant, and 350 tons of bars have been formally awarded to Patterson-Leitch Co., Cleveland. Bids are being taken on an administration building at the plant, requiring 270 tons of bars. For the Main street bridge, Columbus, O., 300 tons have been tentatively awarded to a Youngstown, O., fabricator.

Chicago—Concrete bar orders for the larger lots are few, but business in prospect remains fairly heavy. The largest award is 3200 tons for the Milwaukee filter plant. A sizable tonnage remains to be placed for Chicago sanitary district construction. Plans are being prepared for building additional dams on the Mississippi river which will take several thousand tons of bars, and the federal work relief program elsewhere holds promise of substantial bar orders. A few private projects continue to come up for bids regularly.

Philadelphia—The market is quiet. Awards include 200 tons for a textile plant at Allentown, Pa., for the Ludlow Manufacturing associates, Boston.

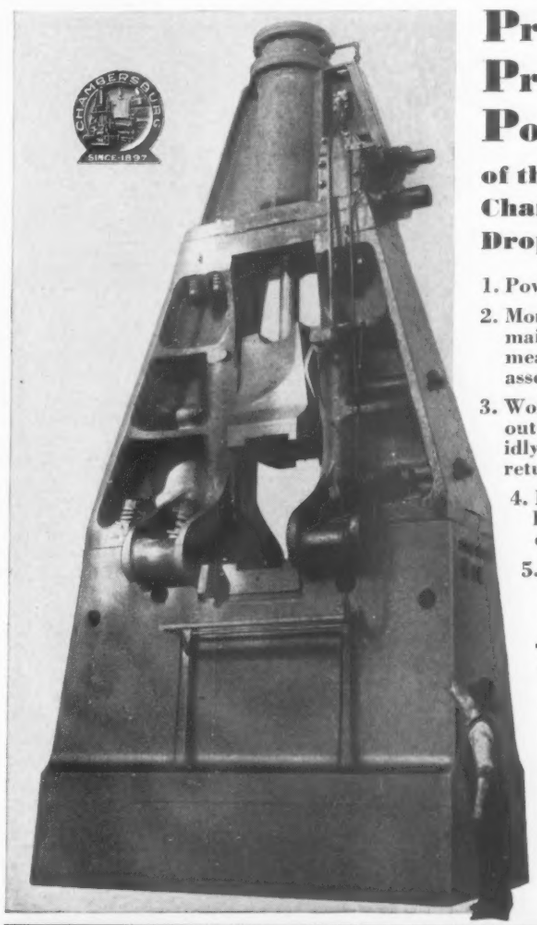
Boston—Reinforcing steel buying is limited to small lots, while tonnage projects are absent with the exception of substantial requirements for a caisson core wall, Enfield, Mass. Fabricators are awaiting the start of the highway and bridge programs under the public works appropriation for the first substantial increase in inquiry.

Washington — The United States Steel Products Co., New York, was winner when a hat-drawing was held here last week to decide which of the 20 identical bidders should be awarded the contract for 500 tons of concrete bars at approximately $39,000, for use at the Panama canal.

San Francisco—The majority of

Concrete Awards Compared

	Tons
Week ended May 25	5,422
Week ended May 18	2,257
Week ended May 11	3,907
This week in 1934	3,257
Weekly average, 1934	4,084
Weekly average, 1935	4,985
Weekly average, April	6,903
Total to date, 1934	107,616
Total to date, 1935	104,677



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5. More continuous operation by elimination of causes of down-time.

This remarkable hammer, which is already setting new production records in some of the largest and most progressive forge shops in the country, is a revelation to all forge shop men who have a chance to check its performance. Details will be given gladly by any Chambersburg-National representative. Bulletin 255 will be mailed on request.

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awards during the week were in lots of less than 100 tons. Total bookings exceeded 1700 tons, bringing the aggregate for the year to 55,540.

Seattle—Construction activity is increasing, and the outlook for reinforcing materials has improved. University of Washington regents, Seattle, will open bids June 18 for a $500,000 women's dormitory, requiring about 150 tons.

Reinforcing Steel Awards

3200 tons, filter plant, Milwaukee, to local distributor; Kramp Construction Co., Berlin, Wis., general contractor.

500 tons, Panama canal, to United States Steel Products Co., New York; awarded by lot at Washington.

350 tons, easterly sewage treatment plant, Cleveland, to Patterson-Leitch Co., Cleveland; through Hunkin-Conkey Construction Co., Cleveland.

325 tons, tunnel sewer, metropolitan district, Hartford, Conn., to Truscon Steel Co., Youngstown, O.

247 tons, state bridge, Los Angeles county, California, to unnamed interest.

200 tons, textile plant, at Allentown, Pa., for Ludlow Manufacturing associates, Boston.

150 tons, Miramonte school, Los Angeles, to unnamed interest.

150 tons, Miles avenue school, Santa Monica, Calif., to unnamed interest.

100 tons, Alexander Hamilton high school, Long Beach, Calif., to unnamed interest.

100 tons, two buildings for College of Medical Evangelists, Loma Linda, Calif., to unnamed interest.

Unstated tonnage, bars and shapes, state bridge, Croydon, N. H., to Concrete Steel Co., New York, and New Hampshire Structural Steel Co., Manchester, N. H.; Kittredge Bridge Co., Concord, N. H., general contractor.

Reinforcing Steel Pending

2450 tons, outfall sewer, Los Angeles county, California; bids July 2.

1750 tons, Henry Hudson bridge, Spuyten Duyvil, N. Y.; bids June 14 to Henry Hudson bridge authority, New York.

1700 tons, grade crossings, Port Richmond-Tower Hill, Staten Island Rapid Transit Co., Staten Island, N. Y.; Poirier & McLane Corp., New York, low on one alternate; P. T. Cox Contracting Co., New York, low on second alternate.

310 tons, water system, Fort Smith, Ark.; bids June 17.

270 tons, administration building, easterly sewage treatment plant, Cleveland; bids being taken.

223 tons, approach spans, Yazoo City-Belzoni highway, Yazoo county, Mississippi.

150 tons, women's dormitory, University of Washington, Seattle; bids June 18.

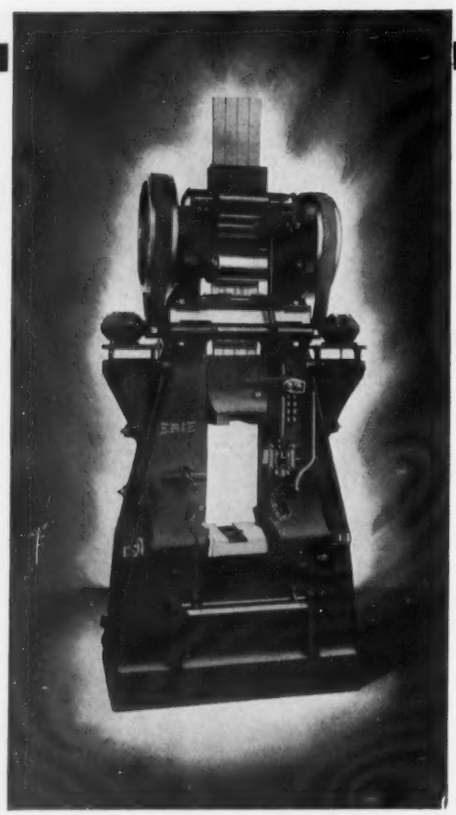
107 tons, state bridge, Hanover county, Virginia; bids May 29.

100 tons, state bridge Chelan county, Washington; bids May 28.

100 tons, Westchester county home, Eastview, N. Y.; W. L. Crow Construction Co., low.

Unstated, 711-foot railroad subway, Nampa, Idaho; James J. Burke & Co., Salt Lake City, Utah, general contractor.

The 84% Step-Child



The recent survey by the "American Machinist" shows that 84% of the hammers in the country are more than ten years old, a percentage exceeded by only one other class of equipment. The only explanation is that the forge shop is the step-child of the plant, in most shops.

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ERIE

Strip Steel

Strip Prices, Page 71

Pittsburgh — Hot-rolled strip steel has been reaffirmed for third quarter at 1.85c, base, Pittsburgh, and cold-rolled strip steel at 2.60c, base, Pittsburgh or Cleveland. Prices on all of the stainless strip steel classifications are unchanged. Even though strip specifications in total are on a slight downtrend, some automotive buyers are still issuing attractive orders.

Cleveland—Northern Ohio strip steel producers report the volume of specifications from automobile and parts manufacturers down about 30 to 40 per cent. A considerable portion of the loss is attributed to recent automobile labor difficulties. Purchasing from these sources for June requirements is expected shortly. On the other hand, demand for cold-rolled strip from miscellaneous stamping and manufacturing interests is at the highest point since early in January.

Chicago — While the tendency in strip steel demand and consumption

is downward slightly, changes in sales and specifications are small. Buyers in some instances are curtailing inventories further, and orders are being placed only for prompt needs. Present prices have been extended into third quarter, but consumers are expected to await the outcome of the steel pricing system before contracting for third quarter needs.

Youngstown, O.—Recent settlement of employes' strikes at various automotive partsmaking centers in northern Ohio and Michigan have stimulated demand for both hot and cold-rolled strip for quick shipment, often calling for truck delivery.

Wire

Wire Prices, Page 71

Pittsburgh—Prices on wire products for third quarter were reaffirmed last week by Pittsburgh producers at 2.30c base on plain manufacturing wire and $2.60 per keg on nails. Spring wire was also reaffirmed at 2.90c, Pittsburgh. Automotive activity is declining, but wire requirements for miscellaneous uses are well sustained, and fencing still makes up a large percentage of present demand. Nail volume is definitely less.

Cleveland — A strong market for wire and wire products is noted. The volume of orders booked by some interests here during the week was the largest of any comparable period since early in January. Some manufacturers are behind schedules in shipments of wire fencing to agricultural areas. The largest demand, however, is from miscellaneous manufacturing sources.

Chicago—Consumption of manufacturers' wire by automotive and miscellaneous industries is well maintained, but declining needs of motor car interests are in prospect. Announcement of fall dating on wire fencing is expected momentarily. Distribution of merchant wire products continues active in some farm areas and moderately good on the average.

Boston—Including specialties, produced largely in this district, wire prices have been reaffirmed for third quarter. Buying is steady and less spotty, with manufacturers' wire and specialties leading demand. Operations are generally sustained.

Youngstown, O.—Manufacturers' and fence wire continue to furnish most shipments from valley wire mills. Finer wires of common grade also are in fair demand. The automotive industry still is the largest single consumer of wire nails.

New York—Prices on various wire products are being reaffirmed for third quarter, including high carbon spring wire, drawn alloy wire and others. Specifications for manufacturing consumers have shown little variation in more than a month. Some improvement is noted in nails mostly by jobbers so far.

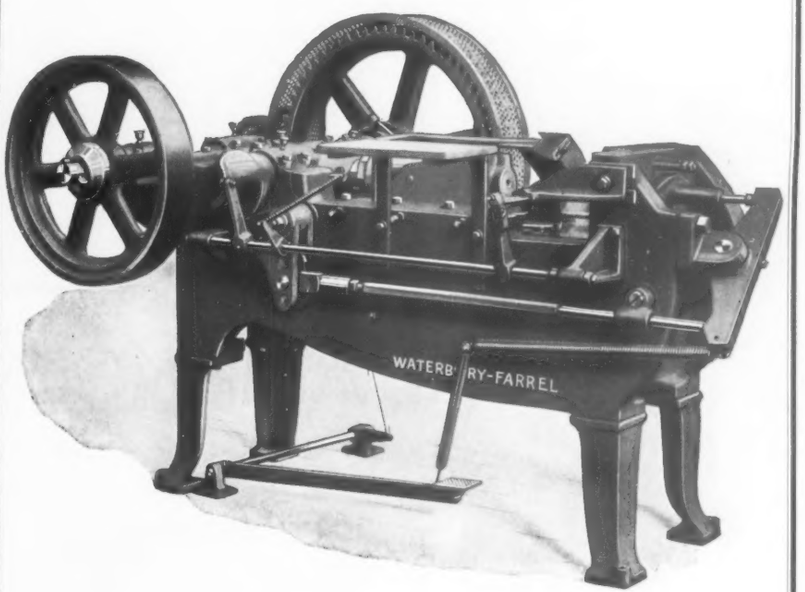
Semifinished

Semifinished Prices, Page 71

Prices on semifinished steel have been reaffirmed for third quarter. Sheet bars hold at $28 a ton, Pittsburgh; billets, blooms, and slabs, $27; forging quality billets, $32; alloy ingots, $40, and alloy blooms, billets, and slabs, $49. Common wire rods also have been extended at $38 and combination wire rods at $40. There will be no change in skelp at 1.70c, base, or in tube rounds at 1.80c, Pittsburgh. Reduced demand for semifinished steel from sheet and tin plate rolling mills has been the cause of decline in specifications. Forge shops also are cutting down on specifications, but pipe producers are quite active in taking skelp and tube rounds.

This Is News

And Should Be Read



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CLEVELAND CHICAGO PHILADELPHIA

Bids on 7500-Ton Bridge Job Itemized

Unit bids, cents per pound, steel in place, Harlem river lift span crossing, Triboro bridge, New York. The unit bids on 33,000 tons for the suspended spans, Triboro bridge, were published in STEEL, March 25, page 66

	2,840,000 lbs. silicon steel, truss spans and towers.	9,420,000 lbs. carbon steel, truss spans and towers.	660,000 lbs. silicon steel, plate girder spans.	1,900,000 lbs. carbon steel, spans.	65,000 lbs. special cast steel.	220,000 lbs. cast steel.
Taylor-Fichter Steel Constr. Co. Inc.	0.065	0.062	0.065	0.062	0.114	0.122
Harris Structural Steel Co. Inc.	0.072	0.066	0.056	0.047	0.09	0.09
American Bridge Co.	0.0814	0.076	0.0528	0.0476	0.098	0.0976
Mt. Vernon Bridge Co.	0.083	0.0784	0.06	0.0554	0.11	0.105
McClintic-Marshall Corp.	0.0938	0.0843	0.0489	0.042	0.1044	0.0977
Phoenix Bridge Co.	0.0838	0.0804	0.0526	0.0464	0.15	0.152
Low totals	$184,600	$584,040	$33,252	$79,800	$5,850	$19,800

	110,000 lbs. wrought, cast malleable and steel, for drainage.	550,000 lbs. sheaves, shafts and bearings in main counterweights.	220,000 lbs. operating machinery for lift span.	150,000 lbs. wire rope and sockets, main and auxiliary counterweights.	Totals, including steel and lump sum items in contract.
Taylor-Fichter Steel Constr. Co. Inc.	0.181	0.139	0.159	0.216	$1,313,668.00
Harris Structural Steel Co. Inc.	0.157	0.115	0.19	0.24	$1,316,102.00
American Bridge Co.	0.1254	0.1115	0.2535	0.1803	$1,438,996.00
Mt. Vernon Bridge Co.	0.10	0.17	0.27	0.25	$1,551,878.00
McClintic-Marshall Corp.	0.1333	0.1182	0.2843	0.2217	$1,577,473.70
Phoenix Bridge Co.	0.216	0.133	0.30	0.30	$1,586,148.00
Low totals	$11,000	$61,325	$34,980		

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—The Market Week—

Pig Iron

Pig Iron Prices, Page 72

Pittsburgh—District furnace base prices on foundry pig iron at $18.50 a ton, on basic at $18, and bessemer at $19 have been extended for third quarter. Likewise, gray forge pig iron has been reaffirmed at the $18 local base. These announcements, made by local pig iron producers last week, did not create unusual interest on the part of consumers, as such action had generally been discounted. Pig iron buying here is still on a restricted basis, and a nonintegrated down-river steelworks shut off shipments of basic iron last week.

Cleveland—Sales and shipments so far in May are practically equal to those in the comparable period last month. A merchant furnace interest booked 3000 tons in small lots during the week. The majority of consumers' stocks are low. Since intrastate freight rates were advanced in Ohio, to become effective June 1, some melters have been specifying a little more liberally. However, as this increase in freight is only 10 to 15 cents a ton from northern Ohio basing points to most consumers it has not proved an important factor in the market. Prices have been extended for third quarter. A differential of $1 a ton for 1.50 to 3 per cent manganese in silveries has been charged, and this has been changed to apply to 2 to 3 per cent, with $1 continuing for each point above 3 per cent.

Chicago—Pig iron shipments so far this month are practically equal to those of the corresponding April period, despite a small decrease in foundry operations. New business is light and is expected to continue quiet next month until the future of the steel code is determined. The market currently is $18.50, furnace, for No. 2 foundry and malleable. Malleable plants continue busy, largely on automotive and farm implement work.

Boston—The Everett, Mass., furnace has reaffirmed prices for next quarter. Delivered Boston prices are 50 cents above the Everett base due to the switching charge. Sales are light with shipments in small lots. Uncertainty as to the continuance of the steel code is an increasing factor contributing to lethargy of consumers.

Several hundred tons of Russian pig iron have arrived at Providence, R. I., and Bridgeport, Conn., for storage, to be sold from stock. Several grades in the shipments, including malleable and high silicon, are being offered at $1 or more under domestic code prices. This is the first Russian

iron to arrive at eastern ports, although rumors have been current that shipments were headed this way.

New York—Pig iron shipments for the month now closing will be below those for April, according to most sellers. This is attributed in part to some anticipatory buying early last month, prior to the freight rate increases. Prices are being reaffirmed for third quarter.

Philadelphia—Buying is spotty although one leading producer reports shipments in May will exceed the April total. Comprising a little over 300 tons, the first lot of Russian iron to be received here arrived recently.

Buffalo—Pig iron demand is now within 10 to 15 per cent of that of the early part of the quarter, having recovered somewhat from the slump which followed inflated shipments prior to freight rate increase. However, the June outlook is not bright. Stocks here have been depleted by shipments by water and are being replenished so slowly it now appears all six currently active furnaces are likely to run through the third quarter if not for a longer period.

Youngstown, O.—The valley pig iron trade is about on a par as to volume with the steel trade, with shipments of hot metal to ingot mold makers forming the bulk of the immediate movement. Reaffirmation of price schedules for third quarter delivery has served to reassure buyers.

Cincinnati—Pig iron prices here were reaffirmed for third quarter at $19.51, delivered, Cincinnati, for northern No. 2 foundry, and the usual 38-cent differential below this for southern iron. Shipments are being well maintained on old orders, but new business is in small lots and reflects cautiousness. The stove foundry melt has been well sustained, and marked improvement is apparent in some machine tool foundries.

Birmingham, Ala.—Base price of pig iron in southern territory continues at $14.50 per ton for No. 2 foundry. The market is fairly steady with prospects of more numerous orders in small tonnages. Furnace companies plan to continue at least five stacks on foundry iron in June and one on basic iron. Eight blast furnaces are now producing, five on foundry, two on basic and one on recarburizing irons. Tennessee Coal, Iron & Railroad Co. banked one furnace.

Toronto, Ont.—Demand is holding at a steady level. The daily melt gradually is increasing and most consumers have good backlogs on books. Production of iron in April totaled 43,388 tons against 44,727 tons in March.

Colorado Fuel & Iron Co., Denver, has reopened offices in the Porter building, Portland, Oreg., in charge of W. E. Madden, district manager.

Scrap

Scrap Prices, Page 73

Pittsburgh—Purchase of several thousand tons of No. 1 heavy melting by an independent steelmaker at $12.50 has caused the market to advance to a range of $12.25 to $12.75, with hydraulically compressed sheets at the same range. Sales of machine shop turnings to at least three consumers here has advanced this grade to a range of $8.75 to $9.25. The market for scrap rails advanced 75 cents a ton to $13.50 when an independent district steelworks paid this price for about 10,000 tons.

Cleveland—Buying of steel and iron scrap is in small lots with indications of heavier movement in a short time. Prices reflect strength without actual increase. The Youngstown, O., market has developed additional strength on buying by an important steelmaker and most grades are quoted at a higher level.

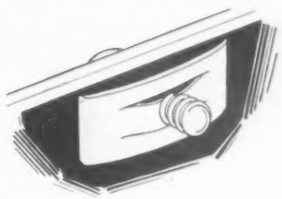
Chicago—The tone of scrap remains strong, aided by coverage on orders for both local and outside delivery. Prices of some grades are higher, but heavy melting steel is nominally unchanged. Brokers continue to offer higher prices than those paid on last mill purchases.

Boston—At firm, and in some instances stronger prices, demand for scrap for export is active. While $8.50 and $7.50, dock, is being paid for heavy melting steel grades, lots of 500 tons or more near shipping ports have brought 25 to 50 cents higher. Other grades for boat loading are more active at strong prices.

New York—Scrap prices are firm and some grades are higher, including heavy breakable cast, turnings and shafting. For export, dealers still pay $8.50, barge, for No. 1 heavy melting steel and $7 for No. 2. Foreign buyers are attempting to get lower prices but without success, due in part to slightly more activity in the domestic market. Rails have moved from this district to the Pittsburgh area at $13.50, delivered, and turnings have sold at $8.50 delivered. Strength in heavy breakable cast has followed some activity at Harrisburg and other eastern points. Low prices at Buffalo have prevented shipments to that area by canal.

Philadelphia—Despite continued dullness in domestic demand scrap prices tend upward with advances on a number of grades. Steelmaking scrap is steady and unchanged.

Buffalo — A general tightening of



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Speed Nut Division
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scrap lines is reported although there have been few sales. Dealers generally are asking $11 or more and claim nothing can be had at $10.50, which consumers say still is their best bid. Malleable has been bid up through heavy demand and shortage and some other specialties are showing much life in small lot dealings. The whole list is nominally 25 to 75 cents higher.

Detroit—While local consumers of scrap have not yet advanced their prices, Youngstown and Pittsburgh buyers have been in evidence and the result is that the market has broken out of its rut and generally increased 25 cents to $1 per ton. Some steel producers had not anticipated that automotive demand for finished material would be sustained so long, and hence have changed their ideas on scrap. Heavy melting steel is now $8 to $8.50, and bundles are $8.50 to $9.

Cincinnati — Quotations on iron and steel scrap moved higher during the past week, on speculative activity of brokers. Mill inquiries indicate early sales at figures higher than odd lot purchases in recent weeks. Malleable scrap continues a strong item. Demand for blast furnace material lags.

Birmingham, Ala. — Buying of steel and iron scrap is at a minimum, with prices firm and tending upward. Melters have considerable stock on hand.

Seattle — Except for increased weakness the market in unchanged. Japan is trying to bear prices and is not buying. The trade is marking time.

Toronto, Ont.—Trading in iron and steel scrap showed a minor decline in the past week. Shipments of heavy melting steel are being made to Hamilton. Foundry iron has a steady call and special grades are in demand. No. 1 machinery cast has picked up and there is a regular call for wrought scrap. Stove plate and malleable are moving slowly.

Warehouse

Warehouse Prices, Page 74

Pittsburgh—Little likelihood is felt of any change in warehouse steel prices for third quarter, except a revision on carbon steel bars.

Cleveland—Warehouse business is considerably lighter than a month ago, traceable to general labor unrest in this district. While settlement of strikes at automobile body plants has been a favorable factor, other strikes, including that at the White Motor Co.'s plant here, have affected interests which generally are good customers of warehouses.

Chicago—Changes in warehouse demand since a month ago are slight and comparison with a year ago continues favorable. Prices are unchanged.

New York—Steel products out of warehouse on which prices have been advanced slightly include certain alloy steels, strip and flat wire, cold-finished carbon steel, No. 24 black and No. 10 blue annealed sheets, floor plates, hoops and bands, hot-rolled steel bars and bar shapes. Volume holds to the recent rate with buying well distributed.

Philadelphia—Buying from warehouse is slow but some jobbers believe the month may compare favorably with April.

Cincinnati—Warehouse business is fairly steady, although industrial needs show signs of moderation, partly compensated by activity in galvanized sheets. Prices are unchanged.

Seattle—The general strike in the logging and lumber industry has slowed demand for warehouse materials and the volume has definitely declined for this reason. Contractors on public works are the principal buyers and farming areas have recently increased buying.

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Metallurgical Coke

Coke Prices, Page 71

Light demand still prevails in the metallurgical coke market, which is also suffering the handicap of inadequate code supervision. Beehive coke prices are under some pressure, and shading from $3.60, Connellsville, Pa., ovens, on standard furnace coke is frequently noted. Nominally, foundry coke is $4.60 or $5.10 to $5.35, depending upon whether common or premium grade is specified.

Shipments are steady at Cincinnati, somewhat below the rate earlier in the year. Prices are unchanged at Chicago and domestic coke shipments are heavy, while foundry grades are steady. Birmingham, Ala., producers keep production at an even rate.

Ferroalloys

Ferroalloy Prices, Page 72

New York—No change is indicated in third quarter prices on ferromanganese and spiegeleisen, and the movement in both products continues steady. Ferromanganese sellers report little variation so far this month, and producers of spiegeleisen report little change since the early part of

March. Ferromanganese is $85, duty paid, Atlantic and gulf ports; and domestic spiegeleisen, 19 to 21 per cent, $26, Palmerton, Pa., on lots up to 50 tons and $24 on 50 tons and over.

Alloy Bars

Alloy Prices, Page 71

New York—Quotations on alloy steel bars both hot-rolled and cold-finished, are being reaffirmed for third quarter. Many producers will be able to open books June 1. The base price at Bethlehem, Pa., on hot-rolled alloyed bars is 2.45c. Bids will be closed May 28 on 50 tons of nickel steel bars for the Washington navy yard.

Coke By-Products

Coke By-Product Prices, Page 71

New York—Distillate buying is better than expected, due largely to activity in the automotive industry, demand from lacquer makers leading toluol. Other industries are taking steady shipments. Benzol also is moving well. Naphthalene spot volume is steady, although the peak of the season has been reached. Flakes and balls to the jobber trade in barrel lots are 4.50c per pound, and 5.00c to retailers. Sulphate of ammonia shipments have declined, as usual at this time.

Steel in Europe

Foreign Steel Prices, Page 74

London—(*By Cable*)—Demand for Middlesbrough pig iron is broadening, and the market for hematite in Great Britain is active. Good demand also is noted for semifinished steel. Restriction of foreign imports has stimulated domestic output. The general steel business is expanding, especially in structurals and for railroad use. Tin plate is quiet with the output at about 50 per cent of capacity. Exports of galvanized sheets are increasing.

The Continent reports quiet conditions, with Germany showing some activity in sales to South America. The French sheet cartel has been dissolved and a substantial break in prices has resulted.

Nonferrous Metals

Nonferrous Metal Prices, Page 72

New York — Active demand and further advances in lead prices commanded the center of interest in nonferrous metals last week. All markets with the exception of copper were active pricewise. Lead advanced $7 a ton, zinc $1, while antimony slumped $30. Tin was marked up to around the 52-cent level.

Lead — Consumers rushed to buy last week, resulting in advances of $1 Monday and $3 on both Tuesday and Wednesday. The market held steady for the remainder of the week with sufficient business to support strongly the current level of 4.25c, East St. Louis. Observers saw no speculative buying but rather for actual needs. Sheet and pipe prices advanced while scrap was stronger.

Copper—Casting metal firmed to a range of 8.00c to 8.25c while export copper advanced to around 8.30c. Electrolytic, however, held at 9.00c, Connecticut, with demand moderate. Sellers do not expect to book the normal tonnage this month.

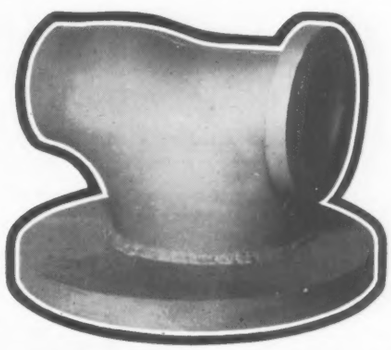
Zinc — Prime western sales increased to 8500 tons during the week ended May 18. This active demand boosted prices $1 a ton to 4.30c, East St. Louis. The market appeared firm at the higher level.

Tin — Steady advance in sterling exchange to the highest level for 1935 was reflected in the upward trend in Straits tin prices. At the close of the week spot was quoted around 52.00c compared with 51.50c at the end of the previous week. Trading was generally light.

Antimony — Coincident with the announcement that the American Oriental Banking Corp. has suspended payments and has applied for appointment of trustees to conserve its assets, spot antimony here Friday was quoted $30 a ton lower at 12.75c, duty paid New York. This was the lowest level reached since November, 1934.

The Depression Is Over! A Skyscraper Is Planned

BUILDING of office skyscrapers, a neglected, if not forgotten, art during the depression, shows a sign of revival in Chicago. The harbinger is announcement of plans for razing a 50-year old, 13-story structure in the loop district of that city and the erection in its stead of a $1,500,000, 15-story office building having foundations capable of carrying six additional stories. The program is sponsored by Northwestern university, owner of the Austin building, West Jackson boulevard, which will give way to the new structure. Holabird & Root, Chicago, are architects. Work will start May 1, 1936.



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Equipment

Chicago—Machinery and equipment business is fairly steady but lacks indications of a prospective major upturn. Small lots generally predominate orders for machine tools, but the total volume compares favorably with that of preceding months and a year ago. Demand for small metalworking tools, while somewhat spotty, is holding fairly well. Inquiries for all types of equipment are in relatively better volume than sales. Prospective business includes equipment for a new plant to be built here by the Liquid Carbonic Co. for the manufacture of brewery machinery. Little government work is pending, while railroads are inactive in the market.

Cleveland—Labor difficulties have again broken out here, with walkouts in four leading plants. These shutdowns always have effect on equipment purchases, either in the form of postponements or cancellations. Robert F. Black, president of the White Motor Co., one of the plants involved, pointed out in a newspaper statement last week that the company has spent over $250,000 recently for precision machinery required in production of new truck models.

Boston—Several of the larger machine building shops have substantial backlogs and are operating full schedules. A good part of this volume in several instances is made up of government orders. Machinery of the automatic high-production type leads in sales and the development of new models by practically every shop in the district has resulted in most business being done on special tools.

Seattle—Activity in mining, particularly in Alaska, is giving equipment dealers a satisfactory spring turnover although at present cessation of lumbering operations, due to a strike, is affecting volume.

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Construction and Enterprise

Michigan

BATTLE CREEK, MICH.—Michigan Carton Co. is planning to expend over $100,000 for alterations and additions to its plant. A larger boiler unit is included in the expansion program.

BIG RAPIDS, MICH.—Private preliminary plans have been completed for either a new building or the remodeling of a former storage building here into a manufacturing plant for a new company to be organized shortly by J. R. Hanks and associates.

DETROIT—Midland Steel Products Co. is erecting a 57 x 130-foot addition to its plant on Mt. Elliott avenue.

DETROIT—Aluminum & Architectural Metals Corp., 1974 Franklin street, has been incorporated to deal in metal products, by Paul R. Marshall, 16891 Burgess avenue.

DETROIT—Magnador Mfg. Co., 14848 Wyoming avenue, has been formed to manufacture tools and machines, by James W. Sibley, 14852 Wyoming avenue.

DETROIT — Joint-Seal Corp., 3600 Trumbull avenue, has been incorporated with $10,000 capital to manufacture piston rings, by Harold A. Bergman, 3690 Trumbull avenue.

DETROIT—Automatic Products Corp. 1145 West Grand boulevard, is reported to be acquiring the air conditioning business of the Air-Way Electric Appliance Corp., Toledo, O. The new unit will be set up as a wholly-owned subsidiary headed by Walter L. Mack, formerly with the Air-Way Electric Appliance Corp. Present plans call for no halt in operations until manufacturing facilities are obtained by the Automatic Products Corp.

PONTIAC, MICH.—Inland Refineries is planning construction of an oil re-

finery at Drayton Plains, Oakland county. Estimated cost $80,000.

SPRING LAKE, MICH.—Col-Press Metals Inc. has been organized to deal in metal products, by Oscar V. Anderson, 4034 West Madison street, Chicago.

Ohio

AKRON, O.—Johnson Steel & Wire Co., Worcester, Mass., has begun construction of a new plant here in the DeValera avenue-Hogue avenue area. J. H. Patterson, residing on Sunset View boulevard, is general manager and vice president of the company. (Noted April 8).

BLUFFTON, O.—Triplett Electrical Instrument Co. will soon start construction of a new manufacturing plant here. The new building will contain approximately 17,000 square feet of floor space.

CLEVELAND—Roberts Machine Co. has been incorporated by Robert S. Etter, Broadview-Pearl Bank building, Sterling W. Rounds, and L. M. Roberts.

CLEVELAND — Utilities Director Rogers, city hall, has ordered a survey made to determine whether extension of the municipal light plant is feasible. Cost of erecting a substation is estimated at $50,000.

MIDDLETOWN, O.—Stockholders of the American Rolling Mill Co. have approved a $4,500,000 appropriation to be used for erecting new mills, including a wide cold strip-sheet mill.

NEWARK, O.—John M. Ankele has purchased the street paving plant owned and operated here by the Federal Asphalt Paving Co., Hamilton, O., and will remodel the plant and begin operations in a month.

NORWALK, O.—It is reported here that an outside firm is negotiating for the purchase of the old Norwalk steel mill, which was bought a few years ago by the Michels Iron & Steel Co., Fremont, O. Farm implement steel and prison bars were made at the mill.

Illinois

CHICAGO—Rotary Engine Corp., 231 South LaSalle street, has been incorporated to deal in mechanical apparatus, machinery, tools and devices used for steam, oil and gas engines, by John J. Mitchell, H. H. Shockey and Stanley Rich. Correspondent: Dunbar & Rich, 231 South LaSalle street.

CHICAGO—Pneumatic Mfg. Co., 733 West Sixty-fourth street, has been incorporated by Eugene H. Lillybeck, Helen M. Lillybeck and Fred F. Fisher, to manufacture pneumatic and hydraulic machinery, tools and appliances. Correspondent: Hurford & Feignholtz, 139 North Clark street.

CHICAGO—Great Lakes Metal Specialties & Mfg. Co., 1850 West North avenue, has been formed by Martin H. Redmer, Fannie Redmer and Harold A. Fein, to manufacture and produce machine screw products, tools, parts, dies and metal specialties. Correspondent: Harold A. Fein, Chicago Temple building.

CHICAGO — Liquid Carbonic Corp., 3100 South Kedzie avenue, is planning to spend between $500,000 and $600,000 for erection of a plant for the manufacture of brewery machinery, and a 4-story office building. Part of this appropriation will be used for machinery and equipment for the new manufacturing division.

Indiana

INDIANAPOLIS — Power Engineering & Machine Co. Inc., 5525 Bonna avenue, has been incorporated to manufacture machinery, by Elmer A. Rox, Alfred Ridley, Benjamin W. Bissell and Paul G. Craver, the latter also being named resident agent.

New York

NEW YORK—Canadian International Paper Co. Ltd., care of International Paper Co., 220 East Forty-second street, will build a mill at Hawkesbury, Ont. Cost is estimated at $50,000.

NEW YORK—Resina Automatic Machinery Co. Inc. has been incorporated with $20,000 capital to manufacture machinery and boilers, by Henry S. Beckwith, 10 East Fortieth street.

NIAGARA FALLS, N. Y.—Carborundum Co. will soon award the contract for construction of a 6-story, 76 x 80-foot, factory to be known as building No. 32. Estimated cost $55,000.

SALAMANCA, N. Y.—Lumnite Products Corp. is planning to erect a factory at a cost of $28,500.

Pennsylvania

PHILADELPHIA — Frankford Arse-

(*Please turn to page* 93)

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2000 quiet, restful, outside rooms —all with bath—from $3

RIGHT AT GRAND CENTRAL

NEW YORK CITY
FRANK J. CROHAN, *President*

(*Continued from Page* 91)

nal, commanding officer, will take bids May 29, circular 387, for a grinding and finishing machine.

VERONA, PA. — Pittsburgh Cold Rolled Steel Co. which recently has resumed operations, employing 100 men, will probably purchase new equipment a little later. (noted May 13).

New Jersey

RAHWAY, N. J.—Merck & Co. Inc., 916 Parrish street, Philadelphia, has filed plans for construction of a new administration and office building here. The permit calls for an approximate expenditure of $200,000.

Connecticut

WATERBURY, CONN. — Connecticut Mfg. Co., Templeton building, has been organized by Charles H. Swenson to specialize in the manufacture of screw machine products, machine screws and rivets.

Rhode Island

PROVIDENCE, R. I.—Franklin Rayon Corp., 86 Crary street, is receiving bids for construction of a 3-story, 100 x 160-foot, rayon mill. Estimated cost $100,000.

Kentucky

BURGIN, KY. — Dowling Bros. Distilling Co. will build a stillhouse, mill, tanks and install elevating equipment at its distillery here. Estimated cost will exceed $28,000.

Alabama

FRISCO CITY, ALA. — Town, Gertrude Sawyer clerk, receives bids May 31 for constructing waterworks, including 100-gallon per minute turbine pump and motor, pump house, steel tank on tower, etc.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids June 4, schedule 5178, one motor-driven precision lathe, delivered San Diego, Calif.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids June 7, schedule 5136, motor-driven centrifugal fresh water pumps and spare parts.

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids June 4, schedule 5191, motor-driven drilling and milling, boring, horizontal machine and equipment, delivered Portsmouth, N. H.

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids June 4, schedule 5192, one motor-driven vertical milling machine; schedule 5193, one motor-driven band saw machine; schedule 5199, six pneumatic grinders, all delivered at Philadelphia.

Georgia

ATLANTA, GA.—Southern Talc Co., Grant building, William B. Harsfield president, wants crushing, grinding and separating equipment for a mine at Chatsworth, Ga.

SAVANNAH, GA.—Savannah Breweries Inc., Moses Berman president, is planning to establish a brewery in a building at 648 Indian street.

Louisiana

NEW ORLEANS—Alcohol Distilling Products Corp., W. O. Hudson president, Maritime building, has acquired four buildings on Press street and will alter and remodel same to be used for the distillation of alcohol.

North Carolina

DURHAM, N. C. — Southern States Tobacco Co., subsidiary of Universal Leaf Tobacco Co., Richmond, Va., has permit for $30,000 tobacco redrying plant, with capacity of 100,000 barrels daily. T. N. Bright, Henderson, N. C., is supervising the work.

Tennessee

KNOXVILLE, TENN.—Director of purchase and sales, Tennessee Valley Authority, receives bids May 31 for air compressors and appurtenances for permanent installation at the Norris and Wheeler power plants.

Virginia

CHATHAM, VA.—Pittsylvania Lumber & Mfg. Co. Inc. plans rebuilding burned lumber plant.

GLASGOW, VA.—Work is proceeding rapidly on the new building to house the carpet and rug plant of Blueridge Co. Inc. Installation of machinery will get under way next month.

Missouri

ST. LOUIS—Carondelet Foundry Co. has purchased from Detroit Electric Furnace Co., 825 West Elizabeth street, Detroit, and is installing a second 3000-pound rocking furnace to handle increasing tonnage of iron castings.

Arkansas

FORT SMITH, ARK.—City receives bids June 17 for constructing new water supply system. Plans and specifications ready for distribution May 25 from office of W. R. Holway, consulting engineer, 302 East Eighteenth street, Tulsa, Okla. Work includes erecting filter plant and installing complete filter equipment, hydraulic turbine generator set, and oil engine generator set.

Oklahoma

OKLAHOMA CITY, OKLA.—Wylie-Stewart Machinery Co. Inc., 1400-26 Exchange avenue, is in the market for three 100 or 125-horsepower natural gas burning engines and three 60 to 75-kilowatt generators, complete with switchboards and equipment.

Texas

BEAUMONT, TEX. — Magnolia Petroleum Co. plans to repair its refinery recently damaged by fire.

HOUSTON, TEX.—United States Tool Corp. has been incorporated by E. G. Lenzner and C. F. Whaley, 2217 Branard street, to manufacture tools.

WOODSBORO, TEX.—Town, E. W. Thurk clerk, receives bids June 3 for waterworks and sewer system. Work includes distribution and plant piping, tank and tower, water supply well and pump equipment, sewage collecting system and sewage disposal plant. PWA loan and grant of $62,000 has been approved.

Wisconsin

CHILTON, WIS. — Calumet county board has appropriated $33,000 for new garage and repair shop for county highway department. Ray Jensen is commissioner.

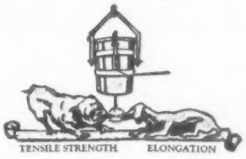
GREEN BAY, WIS.—H. A. Bond and associates have organized the Bond Distilling Co. and will remodel and re-equip the former Hagemeister brewing plant at a cost of $250,000. C. J. Kiefer, Cincinnati, is consulting engineer.

MANITOWOC, WIS. — Manitowoc Knitting Mills, Madison street, will build

(*Please turn to Page* 95)

Strong
STEEL CASTINGS

Acid Open-Hearth Steel



from 1 lb. to 30,000 lbs.

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BUFFALO, N. Y.

SIMONDS
TREATED GEARS

Also—
- Ramsey Silent Chain Drives
- Gates Vulco Rope Drives
- All Steel Silent Pinions
- Bakelite Silent Pinions

TREATED gears for all kinds of service cut and finished to specifications.

Ample equipment for light and heavy gears . . . Prompt delivery.

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SAFETY • STRENGTH • SAVINGS
thru **Simplicity**

Cut your production costs and upkeep! The motor responds to a push-button control bar along the front of the shear, and stops automatically at the top of the stroke. Safety, and no idling motor between operations. Write for full information.

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Moore Rapid LECTROMELT Furnaces

Standard Sizes 25 lbs. to 100 Tons Capacity
Most Rapid and efficient for making
Tool Steels, Alloy Steels, Forging Steels
Steel Castings, Malleable Iron, Grey Iron, Carbide, Ferro-Alloys etc.
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ANGULAR STEEL GRIT

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Using Bituminous and Anthracite Coals Raw and Scrubbed Gas for Displacing Oil. City and Natural Gas, Coal and Coke in Furnaces of all descriptions.

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SC&H Furnaces are built in all sizes of Oven, Pot, Continuous, and Special Types for Electric, Oil or Gas application.

SMALL ELECTRIC STEEL CASTINGS
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CLEVELAND — OHIO, U. S. A.
"He Profits Most Who Serves Best" — *Better Steel Castings*

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STAMPINGS
SEND SAMPLES OR BLUE PRINTS FOR ESTIMATES
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MALLEABLE IRON CASTINGS
Detachable Sprocket Chain
Riveted Sprocket Chain
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We solicit your inquiries for gray iron production castings, semi-steel castings and alloy castings.
The FOREST CITY FOUNDRIES Co.
"SINCE 1884" CLEVELAND, OHIO

(*Concluded from Page* 93)

a 1-story addition to its knitting mill.

MARSHFIELD, WIS. — Marshfield Brewing Co. will soon start work on rebuilding and making alterations to its brewery at a cost of more than $25,000, and will include installation of additional brewing equipment.

MILWAUKEE—Dunck Tank Works Inc., 2426 North Thirtieth street, manufacturer of brewery equipment, is building another addition to its plant, the third extension since legalization of beer.

MONROE, WIS.—Green county board contemplates building a garage and machine shop, 100 x 100 feet, for county highway department. Herman W. Kohn is highway commissioner.

Minnesota

COTTON, MINN. — American Moss Peat Co. plans to construct a factory here. Work will be done under separate contracts. Estimated cost $50,000.

DULUTH—Elliott & Co., Oneota street, will soon award contracts for construction of an addition and alterations to packing plant. H. Peter Henschien, 59 East Van Buren street, Chicago, is architect.

DULUTH—M. A. Hanna Coal & Dock Co., Fidelity building, plans construction of a coal dock to cost $250,000, and will include installation of considerable machinery and equipment for loading and unloading.

SPRING VALLEY, MINN.—Village plans construction of a municipal power plant and electric distribution system G. M. Orr & Co., 408 Baker building Minneapolis, engineer.

ST. PAUL—Midway Truck Terminal Co. has awarded contract for construction of a truck terminal on Charles street, 60 x 200 feet, to cost $60,000, which will accommodate 100 trucks and will include a machine shop and equipment for loading and unloading. C. H. Johnston, 360 Robert street, is architect.

South Dakota

YANKTON, S. DAK.—Stuelpnagel & Grow Inc. has been incorporated with $20,000 capital to manufacture machinery, by John W. Stuelpnagel, Paul W. Grow and Philip W. Eysenbach.

Iowa

OSKALOOSA, IOWA—L. A. Meeker and J. H. Dutro, of Montezuma, Iowa, have leased and are remodeling a building here preparatory to the opening of the O. K. Tire Welding Shop. Electric welding equipment will be installed, along with other modern equipment.

Montana

FORT PECK, MONT.—United States government, Capt. Theodore Wyman Jr., 707 Postal Telegraph building, Kansas City, Mo., will receive bids until May 31 for furnishing and erecting steel sheet pile retaining walls for the closure section of the Fort Peck dam project. Schedule one includes 335,000 square feet of steel sheet piling, straight web type, and 12,000 square feet of steel sheet piling, arch web type. Schedule two includes 410,000 square feet of steel sheet piling, straight web type.

GREAT FALLS, MONT. — Connelly Machinery Co., Billings, Mont., has opened a branch office and warehouse here for the sale and servicing of road construction machinery and industrial equipment. Walter McGhee is manager.

PHILLIPSBURG, MONT. — Phillipsburg Mining Co. plans construction of an ore mill to replace mill damaged by fire recently. Joseph Yob is manager.

Pacific Coast

BRENTWOOD, CALIF.—Diablo valley vineyardists are forming a co-operative to build a $100,000 winery at Lone Tree Crossing, near here. The group is headed by W. W. Morgans Jr., Brentwood, and C. G. Schuman. Construction is to begin immediately.

SUNNYVALE, CALIF.—M. L. Levy, Gardner building, plans the construction of a distillery, estimated to cost $30,000.

MEDFORD, OREG.—City council will receive bids June 12 for construction of a sewage treatment plant, including installation of tanks, pumps, cast iron pipe, valves and other appurtenances.

PORTLAND, OREG.—Columbia Distilleries, Pittock block, contemplates the construction of a distillery at Salem, Oreg. Estimated cost $75,000.

PORTLAND, OREG. — Alaska Junk Co., First and Clay streets, has awarded contract for alterations to concrete warehouse and erection of an addition.

ROSEBURG, OREG. — City officials plan to undertake jointly with the United States veterans hospital a $100,000 project involving sewer and disposal systems.

SEATTLE—Brady Construction Co. has a $15,000 contract for building an addition to office and plant of Union Oil Co., 2901 Western avenue.

SEATTLE—J. F. McBurney, president, Lakeview Gold Mines, Mammoth mining district, Montana, announces new equipment is being installed, including a 70-ton ball mill, Blake crusher, flotation plant, compressors, classifier and a new power plant of 80-horsepower capacity. It is expected to begin operations in October, 500,000 tons of milling ore having been blocked out.

Scrap Exporters' Conference Continued; Trade Defended

(*Concluded from Page* 36)

is used in direct preparations for war, such as battleships, guns, munitions, etc. In countries like Japan, Italy, Poland, and Great Britain, which are operating at a high industrial rate today, the vast bulk of the steel produced is used for industrial purposes, the building of railroads, roadways, new structures, modernization of equipment, transportation, communication, etc. If this is for war purposes, then our whole industrial and economic life certainly must center around preparation for war.

"With every effort being made today to increase business activity, to re-employ people, to raise commodity prices, to encourage our export business and to give a full opportunity for livelihood to the smaller businessman, it seems inconsistent to distort the normal relationship of scrap exports to the rest of our foreign commerce. Scrap iron exports have developed for more than 20 years without affecting our natural resources or our national economy.

"It is earnestly believed that natural forces such as the stabilization of exchanges and the increased production of steel by the United States will rectify any distortions in the picture and will continue to maintain a normal relationship of scrap exports to domestic requirements."

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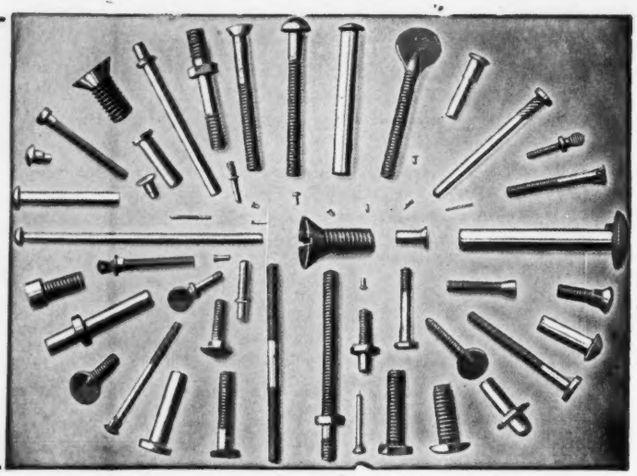

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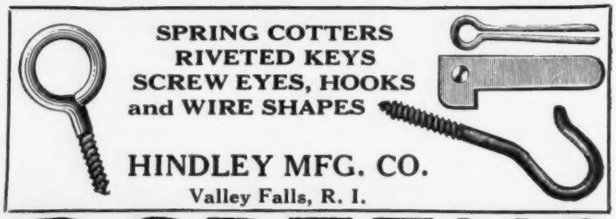

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